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An Investigation into the Qualitative Characteristics of Large Infrastructure and Project Finance Ventures in Southern Africa

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A thesis submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand in fulfilment of the requirements for the degree of Doctor of Philosophy.

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: Professor Anthony Stacey

Wits Business School
4 November 2016

ABSTRACT

Sub-Saharan Africa faces severe infrastructure deficits including in power generation, water facilities, transportation, and telecommunications. These deficits compound the socio-economic challenges of the most impoverished region in the world. It is estimated that funding of US$ 90 billion per annum is required to address infrastructure deficiencies. Other developing regions including Asia, the Middle East, and South America, have with varying degrees of success utilised the project finance framework to address similar infrastructure deficiencies, and also develop other commercial ventures. Africa has lagged behind in this respect, and still accounts for less than 3% of international project finance flows. The ability to attract and access international and domestic project finance capital, and execute the underlying ventures is an important opportunity to address the challenges noted above.

The study contributes to knowledge by deepening our understanding of project finance in South Africa, Mozambique, and Zimbabwe in the following ways. Firstly, it offers a model through which to monitor key contextual factors that influence the success, failure, and shaping of project and infrastructure ventures. Secondly, it interrogates the main capital structure theories including the static trade off and pecking order theories, and their applicability and relevance for project and infrastructure finance in the selected jurisdictions. It then compares capital structure theory with actual practice of capital structure formulation in the 7 cases studies investigated. This yields important insights as to the most important factors influencing capital structure in project finance in the three selected countries. In particular the constrained supply of capital is observed as the top factor determining capital structure. It further enhances our understanding of why ventures using project finance in these countries may have significantly lower leverage than other similar ventures in developed regions of the world. Thirdly, the study extracts key insights into how stakeholder interactions evolve in the projects by applying stakeholder agency theory to project sponsors, managers, contractors, state institutions, and community organisations. Collectively these insights should contribute to attracting increased capital to project finance in Sub-Saharan Africa, and arranging projects with greater prospects of operational success.

Key Words: Project Finance, Capital Structure, Leverage, Public Private Partnerships, Infrastructure, Risk Management, Contracting and Stakeholders.

DECLARATION

I declare that this research project is my own, unaided work. It is submitted in partial fulfilment of the requirements of the degree of Doctor of Philosophy for the Wits Business School, University of the Witwatersrand. It has not been submitted before for any degree or examination in any other university.



_____ 4 November 2016

David Makovah **Date**

DEDICATION

The greatest and most important problems of life are fundamentally unsolvable. They can never be solved, but only outgrown. – **CARL JUNG**

A light shines on in the darkness, a light that darkness cannot overcome – **PROLOGUE TO JOHN'S GOSPEL 1:5**

First there is the fall, and then we recover from the fall. Both are the mercy of God! – **LADY JULIAN OF NORWICH**

This thesis is dedicated to my late maternal grandparents, Jeseline Nyelukwa and Philip Jabani Nyelukwa. Thank you for your great love, selflessness, discipline, and belief in me.

To my students - Past, Present, and Future. Thank you for the teachings.

And to Charmaine, and the adventure on which we have embarked.

ACKNOWLEDGEMENTS

The initial stimulus and support for this work came from the team at the Wits Business School (University of the Witwatersrand). A seed was planted in 2008 by the then Director that subsequently blossomed and took shape. Its academic faculty have supported me, believed in this work, and, on occasion, robustly challenged me. Thank you Eric Schaling for keeping the faith.

Unbeknown to even themselves, certain members of the supporting staff have been an inspiration in how they have gone about their backstage duties, and allowed me in some small part, to birth their dreams for the Wits Business School, hopes for what their children can accomplish, and what South Africa can become.

A huge note of gratitude to all the respondents that participated in the interviews, sharing of their time, knowledge, wisdom and insight. Ultimate credit for the contribution this work makes must go to them. Any deficiencies however are ultimately my own.

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LIST OF ABBREVIATIONS

ANC	African National Congress
AU	African Union
ARDA	Agricultural Rural Development Authority
AfDB	African Development Bank
BEE	Black Economic Empowerment
BO	Build and Operate
BOO	Build Operate Own
BOT	Build Operate Transfer
CSR	Corporate Social Responsibility
DBSA	Development Bank of Southern Africa
DFI	Development Finance Institution
DoE	Department of Energy
DSCR	Debt Service Cover Ratio
DTI	Department of Trade and Industry
DPE	Department of Public Enterprises
EAC	East African Community
ECOWAS	Economic Community of West African States
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPC	Engineering Procurement Construction
EU	European Union
FOAK	First Of A Kind
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GMA	Gautrain Management Agency
HDI	Human Development Index
HTGR	High Temperature Gas-cooled Reactor
ICT	Information and Communications Technology
IDC	Industrial Development Corporation
IFC	International Finance Corporation
IFRS	International Financial Reporting Standards
IMF	International Monetary Fund
IPA	Investment Protection Agreement
IPP	Independent Power Producer
IRP	Integrated Resource Plan
IRR	Internal Rate of Return
IRU	Indefeasible Right of Use
LLCR	Loan Life Cover Ratio
MDC	Movement for Democratic Change

MENA	Middle East and North Africa
MIGA	Multilateral Investment Guarantee Agency
MOZAL	Mozambique Aluminium Smelter
MRTR	Minimum Required Total Revenue
NECSA	Nuclear Energy Corporation of South Africa
NEPAD	New Partnership for African Development
NERSA	National Energy Regulator of South Africa
NT	National Treasury
PA	Patronage Agreement
PPA	Power Purchase Agreement
PBMR	Pebble Bed Modular Reactor
PIDA	Programme for Infrastructure Development in Africa
NPIF	Normative Project and Infrastructure Finance
PPA	Power Purchase Agreement
PPP	Public Private Partnership
REFIT	Renewable Energy Feed In Tariff
REIPPP	Renewable Energy Independent Power Producer Programme
SADC	Southern African Development Community
SNGP	Sasol Natural Gas Project
SPV	Special Purpose Vehicle
SWIFT	Society of Worldwide Interbank Financial Telecommunication
VAS	Value Added Services
ZANU	Zimbabwe African National Union
ZAPU	Zimbabwe African People's Union
ZERA	Zimbabwe Energy and Regulatory Authority

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1 Introduction and Overview

1.1 Introduction

South Africa, Mozambique and Zimbabwe are medium to small countries located in Southern Africa, and with populations of 54.5 million, 27.9 million and 15.6 million respectively (United Nations World Population Report, 2015). Each of these three countries has a relatively recent apartheid or post-colonial history, with independence having being achieved in 1994 in South Africa, in 1980 in Zimbabwe, and in 1974 in Mozambique. Shortly after its independence from Portuguese rule, Mozambique succumbed to a debilitating civil war that was finally resolved in 1990. As a result of the turbulence in their contemporary histories, each of these countries have inherited a particular socio-economic construct characterised by extreme inequality, complexity and uncertainty, and rapid changes with exposure and integration into the international economy. The United Nations Human Development Report (2015) ranks countries in terms of a Human Development Index (HDI) compiled on the basis of longevity, education, and income. According to this report South Africa ranks 116, Mozambique 180, and Zimbabwe 155, out of a total of 188 countries. The three countries are also characterised by high levels of poverty with the population living below the income poverty line being 53.8%, 54.7%, and 72.3% for South Africa, Mozambique, and Zimbabwe respectively. The high levels of poverty are exacerbated by extreme income inequality with South Africa having a Gini-coefficient of 65.0, Mozambique of 45.7, and an undetermined factor for Zimbabwe.

Post-independence, all three countries have embarked on what can be broadly described as transformation projects. These transformation initiatives have been specific interventions led by the state to rearrange their societies, and address the adverse structural remnants of the apartheid and colonial era. While these transformation projects have enjoyed varied degrees of success, considerable challenges remain. Economic output continues to be biased towards primary sectors including mining and agriculture, with inadequate expansion of the secondary and tertiary sectors. This phenomenon is particularly acute in Mozambique and Zimbabwe. In addition, significant deficiencies in infrastructure detailed in the literature review, create formidable hurdles to socio-economic development by increasing the cost of doing business, and discouraging domestic and international investment prospects. Notably, many of these symptoms are prevalent in many countries in Sub-Saharan Africa.

In order to address these socio economic challenges, and to support and add impetus to the transformation projects underway infrastructure deficits will need to be addressed, and countries will of necessity have to attract domestic and international investment capital to execute commercial projects of scale. A failure to address these infrastructure deficits, and to attract investment capital that executes commercial ventures at scale, will render it extremely difficult if not impossible to address the socio-economic challenges raised above. This may jeopardise the possibility to make a meaningful contribution to the socio-economic well-being of the residents of these three countries, and the approximately 962 million people living in Sub-Saharan Africa (United Nations World Population Report, 2015).

Other developing regions in the world have managed to effectively supplement their infrastructure funding gap by making use of the unique characteristics specific to the project finance framework. From 1986 to 1996 infrastructure investment was the fastest growing component of capital flows to developing markets, increasing from US$1.3 billion to US$27 billion over the period (Dailami and Leipziger, 1998). The bulk of this funding was packaged in the form of project finance. Yet as of 2008, Africa still accounts for less than three per cent of international project finance loans (Hainz and Kleimeier, 2012). The ability to attract and access international and domestic project finance therefore represents an important potential source of capital for the African continent in general, and the three selected nations of South Africa, Mozambique, and Zimbabwe that are the focus of this research endeavour. Project finance has been successfully applied in energy, sanitation, education, healthcare, transport, agriculture, and other sectors. It has the potential to have a meaningful impact in improving the socio- economic environment in the three countries above.

The limited deployment of project finance in the Sub-Saharan region in general and the three countries that are the focus of this thesis in particular, has contributed to a situation where project and infrastructure finance in these geographic locations appear to be inadequately researched. Therefore, the general purpose of this study is to extend our knowledge of how organisations using the project finance framework arrive at their capital structure and to what extent the financing behaviour of South African, Mozambican, and Zimbabwean projects are consistent with the theoretical explanations of the static trade-off and pecking order theories of capital structure. In addition, the thesis investigates how stakeholders in such projects interact with the project company and each other, how project companies prioritise engagement with stakeholders,

and how stakeholder interactions can be enhanced to strengthen the entire project, by applying stakeholder agency theory.

1.2 Motivations and contribution of the study

There are five major motivations for the current study:

The first motivation is to investigate important contextual considerations that are important to and influence the execution of project and infrastructure finance in the three countries of focus, and implicitly other countries in Sub-Saharan Africa. Contextual considerations are important due to the very different social, economic, and political environment in the three countries in which the case studies are located. These conditions differ markedly from Western Europe and North America where much of the existing academic research has been conducted, and are important in pursuing and executing successful project finance transactions.

Secondly, the capital structure decision has been at the forefront of financial research ever since Modigliani and Miller (1958) suggested capital structure has no effect on firm performance. Subsequently extensive academic research has been conducted and resulted in theories, explanations and a voluminous body of academic research. Despite this expansion in knowledge these theories have failed to fully explain the capital structure decision (Graham and Leary, 2011). Furthermore, the overwhelming majority of studies on capital structure have been focused on developed markets with particular emphasis on North America and Western Europe. Whilst the number is growing rapidly, the number of studies in developing markets on capital structure are still limited. Studies on capital structure in Sub-Saharan Africa appear to be even fewer than those in other developing markets. To the best of the researcher's efforts no study has been performed on qualitative factors that influence the capital structure of project finance ventures in Sub-Saharan Africa. This scarcity in research on capital structure in project finance in Sub-Saharan Africa can partially be attributed to the region being a marginal participant in terms of the number and value of project finance transactions executed. In addition, the mainstream capital structure theories are largely premised on developed market conditions and assumptions, and their applicability to very different conditions in Sub-Saharan Africa is an important consideration. The questions that arise from this gap in the academic literature include:

- What are the main determinants of capital structure and financing behaviour for project finance ventures in South Africa, Mozambique and Zimbabwe?

- To what degree are the assumptions in the mainstream static trade-off and pecking order theories applicable to project finance ventures in South Africa, Mozambique and Zimbabwe?

- Are the explanatory powers of the static trade-off, pecking order theories, and limited academic literature on project finance applicable to project finance ventures in the three countries?

The third motivation is to establish what the main determinants of capital structure and financing behaviour from the perspective of practitioners, in the 7 project and infrastructure case studies on which the thesis is premised. Extracting the practitioner perspective should facilitate a comparison between academic theory and practice. Where divergence between these is found, this has the potential to contribute to a fuller understanding of capital structure formulation.

The fourth motivation is to understand the interactions between important stakeholders that participate in project finance transactions. Questions regarding these stakeholders include how interactions are managed, how disputes are resolved, how power is distributed and exercised, and a holistic enquiry on projects within the broader societies in which they are undertaken.

The fifth and final motivation to this study is to add understanding and knowledge regarding the execution of project finance in Sub-Saharan Africa. An achievement of this motivation can assist in attracting greater investment capital to these projects and the region as a whole, and contribute to addressing the socio-economic deficits suffered by a region that endures the highest regional poverty rate in the world (United Nations Human Development Report, 2015).

This study seeks to fill these gaps in the literature and satisfy the five motivations above by completing 7 case studies on project and infrastructure transactions located in South Africa, Mozambique and Zimbabwe that address these matters. A contribution that gives insight as to how to better arrange and more effectively structure project and infrastructure transactions, and therefore attract greater investment capital, will make a significant contribution to improving the economic

vibrancy and the lives of residence in the most impoverished and least developed region of the world. This could make a valuable contribution in alleviating the economic and social challenges expressed in the development statistics detailed above. These motivations constitute the main contributions of the study.

1.3 Objectives of the study

The focus of this study is on contextual factors that impact on project finance transactions in South Africa, Mozambique and Zimbabwe. In addition, the study explores the financing behaviour of 7 project finance transactions executed in these countries by way of the case study method. Finally, the study examines stakeholder interactions in the case studies, through the lens of stakeholder agency theory. More specifically the study aims at:

1 Examining the key contextual factors that influence the execution of project finance ventures in the three focus countries specifically, with an intent to make these observations implicitly relevant to Sub-Saharan Africa.

2 To investigate evidence on the applicability of the static-trade off and pecking order theories on the selected 7 project finance transactions, and examine reasons for consistency with these theories or deviations from them.

3 To investigate the reasons offered by practitioners in arriving at the capital structure of a project and to compare and contrast academic theory with actual practice.

4 Based on the above points, to integrate the insights obtained into a coherent advisory theory on capital structure formulation on project and infrastructure ventures in Sub-Sharan Africa.

5 To investigate how different stakeholders, interact with the project company, and how the project company chooses to prioritise engagement with important stakeholders including sponsors, management, contractors, state institutions, and community organisations.

1.4 The organisation of the thesis

Introduction

The thesis commences with a literature review and an analysis of the seminal studies on capital structure formulation and the major theories that have emerged. This is followed by a review of the empirical studies on these major theories including those in the developed world, developing world, and Sub-Saharan Africa. The second part of the literature review considers the role of agency theory in decision-making within a firm and broadens the analysis from the traditional owner/manager principal agent relationship, towards stakeholder agency theory that includes other actors who affect or are affected by the firm's activities. This is followed by a review of the studies performed on interest alignment mechanisms and performance based contracting, that are particularly pertinent to project and infrastructure finance. The third part of the literature review analyses and distils the limited academic literature performed on project finance (including Private Public Partnerships) as a field of study. The final part of the literature review summarises the Africa infrastructure deficits, the causes of these deficits, their impact in terms of social and economic development, and the potential to accelerate socio-economic development and all round human welfare on the continent if these deficits are significantly addressed. The potential role of project and infrastructure finance in addressing these deficits is considered. The literature review concludes with a summary of the gaps in the academic literature regarding the applicability of the major capital structure theories, stakeholder agency theory, and on project and infrastructure ventures in South Africa, Mozambique and Zimbabwe.

Methodology of data collection

Chapter 3 introduces the methodology section that begins by explaining the suitability of the qualitative research approach and introduces the case study method. This is followed by an explanation of how the seven case studies were selected and how the cases were constructed and the data analysed. A discussion on measures taken to ensure the validity and reliability of data and the limitations of the study conclude the section on methodology.

Capturing and analysis of collected Data

Chapter 4 captures details pertaining to the 7 case studies that are the basis of the thesis. Four of the cases are located in South Africa, two in Mozambique, and one in Zimbabwe. The cases are clustered according to their countries of origin. Each case is introduced by way of a 'Fact Sheet' that captures the key details of the project. This includes the project description and details of the developers, EPC and related contractors, source of capital, key shareholders, and the project objective. Each case is then documented utilising information obtained from interviewees, financial statements, corporate documentation, and related reports as explained in the methodology in chapter 2. The information is organised in the following format to enable a coherent collation. A brief background of each case is given, followed by an examination of the financial structure, including ownership and how the financing for the project was arranged. A consideration is made of the key risks relating to the project and how these were mitigated in the project arrangements. The governance, institutional, and legal arrangements pertaining to the project are identified and considered in enabling the project to proceed. Each case then concludes with a summary of the lessons learned.

In Chapter 5 a cross case analysis is performed and key assertions derived from each individual case study are distilled, discussed, and cross-referenced across all the cases to determine each assertion's generalizability and limitations. The implications of the assertions on project and infrastructure finance are considered insofar as they contribute to project failure or success. As a result of the cross case analysis the thesis begins to distil actual management practice in the execution of project and infrastructure finance, and best practices begin to emerge together with proposals that have the potential to enhance project success if implemented.

In Chapter 6 a model that distils the key contextual factors that influence project finance arrangements in South Africa, Mozambique and Zimbabwe is advanced. The chapter summarises the key findings form the case studies and cross case analysis and proposes a model through which to more fully understand project finance transactions called Normative Project and Infrastructure Finance (NPIF).

In Chapter 7 an enquiry as to how capital structure is arrived at in the 7 cases. This includes a consideration of the applicability of the main capital structure theories, including the static trade-off and pecking order theories, and an examination of reasons for consistency or deviation with these

theories. The analysis of the applicability of the existing theory and observations made, are contrasted and compared with the actual decisions and reasons offered by project sponsors and managers in arriving at the capital structure choices of their respective ventures. This facilitates a comparison between theory and practice.

Chapter applies stakeholder agency theory to the 7 case studies in order to investigate how different stakeholders interact with the project company, and how the project company through its management chooses to prioritise engagement with stakeholders. The role of state institutions in project finance given the challenging contemporary history of South Africa, Mozambique, and Zimbabwe is investigated, analysed and explained.

Contribution to body of knowledge

Chapter 9 concludes with the research findings and details the significant contribution made to knowledge. It considers the implications of this contribution to knowledge to the theory of capital structure and project finance, policy formulation, and methodology. The chapter concludes by stating the limitations of the study and making recommendations for further research.

2 Literature Review

The literature review commences with an analysis of the seminal studies on capital structure formulation and the major theories that have emerged. This is followed by a review of the empirical studies on these major theories including those in the developed world, developing world, and Sub-Saharan Africa. The first part concludes with a consideration of financial contracting factors affecting capital structure. The second part of the literature review elaborates on the role of agency theory in decision-making beyond capital structure determination. It broadens the analysis from the traditional owner/manager principal agent relationship, towards stakeholder agency theory that includes other actors who affect or are affected by the firm's activities. The empirical studies on agency theory and stakeholder agency theory offer compelling reasons as to why this paradigm may enable deeper insight and understanding regarding stakeholders in firms, and a complementary and valuable perspective relative to the main capital structure theories. This is followed by a review of the studies performed on interest alignment mechanisms and performance based contracting, that are particularly pertinent to project and infrastructure finance. The third part of the literature review analyses and distils the limited academic literature performed on project finance (including Private Public Partnerships) as a specific discipline. It highlights how project and infrastructure finance differ from other financing arrangements, the advantages and disadvantages of this model of the firm, and its practice across the globe with specific comparisons between Sub-Saharan Africa and the rest of the world. It introduces the potential of an eclectic approach to exploring project and infrastructure finance ventures by blending established capital structure theories and stakeholder agency theory. This is elaborated on in the methodology section in chapter 2. The final part of the literature review summarises the Africa infrastructure deficits, the causes of these deficits, their impact in terms of social and economic development, and the potential to accelerate socio-economic development and all round human welfare on the continent if these deficits are significantly addressed. The potential role of project and infrastructure finance in addressing these deficits is considered. The literature review concludes with a summary of the gaps in the academic literature regarding the applicability of the major capital structure theories, stakeholder agency theory, and on project and infrastructure ventures in South Africa, Mozambique and Zimbabwe.

2.1 Introduction

The capital structure decision and competing theories on the formulation of capital structure continue to be important features of financial research. The seminal work of Modigliani and Miller (1958) was ground breaking in formulating a theoretical framework on the implications of capital structure on a company's profitability and performance. The first proposition in this theory hypothesised that the capital structure of a firm did not determine its value, cost of capital, and performance. The theory suggested the value of a firm was determined by its ability to generate profits and the risks related to its underlying assets, and as such the value of a firm is independent of its capital structure. This theory was premised on a number of key assumptions including perfect capital markets, no taxes, no transaction costs, no bankruptcy costs, identical borrowing costs for companies and investors, symmetry of market information, and no effect of debt on a company's earnings before interest and tax.

The second proposition incorporated the implications of tax and concluded that higher leverage and the concomitant tax shield resulting due to the deductibility of interest payments, would largely be offset by a higher cost of equity, resulting in the cost of capital remaining unchanged. Modigliani and Miller (1963) issued a correction to this second proposition, acknowledging that marginally greater benefits do accrue to a company on account of the tax shield that is derived as a result of the tax deductibility of interest expense, compared to the incremental costs that concomitantly arise due to the higher cost of equity. In addition to this Miller (1977) observed that for mature and stable companies the tax benefits that accrue as a result of interest deductibility outweigh bankruptcy costs, and this observation would indicate that capital structure influences the value of a firm.

While the assumptions incorporated in this theory of investment allowed for the development of an overarching theory, they have drawn criticism for the degree to which the theory is disconnected from the empirical determination of capital structure in practise (Glickman, 1986). Substituting the assumptions in the theory and applying real world conditions highlights the importance of capital structure to a firm, whilst simultaneously rendering the propositions and implications prompted by Modigliani and Miller (1958; 1963) important considerations in capital structure deliberations. The contribution by Modigliani and Miller (1958; 1963) has been instrumental in prompting further research in capital structure, including the development of new and competing theories, and the formulation of theoretical frameworks that are more nuanced and with a

firmer grounding in the actual practice and implementation of capital structure decisions. There are four main theories that have emerged attempting to explain how managers make capital structure decisions and actual financing behaviour. These are the static trade off theory, the pecking order theory, the market timing theory, and agency theory. With the exception of the market timing theory, the hypotheses articulated in these theories are relevant in the investigation as to how capital structure is formulated and agency costs managed in project and infrastructure arrangements in the selected case studies that are the focus of this thesis.

The market timing theory posits that firms are generally not concerned whether they raise capital via debt or equity and that market timing is the most important determinant Baker and Wurgler, 2002). The choice between debt and equity issuance is therefore a function of which of the two are more highly valued by financial markets at a point in time. High share valuations are more likely to result in equity issuances, while comparatively higher bond valuations are likely to result debt issuances. The market timing theory is excluded for five main reasons. Firstly, the 7 cases have been established as special purpose vehicles (SPV) and standalone entities with a defined business objective or project. Project sponsors and managers are contractually curtailed and limited in their authority deviate from this business or project objective, and opportunistically raise new capital for the prescribed project, or anticipated future opportunities. This prescription and limitation renders the market timing theory largely irrelevant to the 7 cases under consideration. Secondly, it is extremely difficult, and of limited value to establish the degree to which capital structure in the 7 cases and SPVs has been influenced by any opportunistic capital raising initiatives espoused in the market timing theory by any listed sponsors. This is because the capital structure of the listed sponsors incorporates multiple project considerations spanning extended periods of time. Identifying a direct link between opportunistic capital raising based on the market timing theory by listed sponsors, and the underlying project, would at best be tenuous and at worst entirely unrelated. Thirdly, a consideration of how the market timing theory influenced the sponsor capital structure and how this was possibly transmitted to the applicable underlying project would contaminate a discrete analysis of the determinants of capital structure in each case. Fourthly due to all projects having multiple capital providers, the influence of any one capital provider is significantly diluted in the capital structure of each project muting any impact of market timing theory activities being transmitted into the capital structure of the underlying project. Finally, the high leverage and bespoke capital structure arrangements in project and

infrastructure finance detailed in section 2.6 negate the relevance of the market timing theory for the purpose of this thesis.

2.2 Static Trade off Theory

The static trade off theory proposes that the capital structure of a company is determined by the trade-off of the costs and benefits of borrowing, assuming the firm's assets and investment plans remain unchanged. The benefits of debt manifest in the form of the tax shield that is enjoyed on account of the interest expense being tax deductible and the reduction of the problems associated with free cash flow. The costs of debt occur in the form of higher bankruptcy risks (legal and administrative) and agency conflicts between shareholders and debt providers (Modigliani and Miller, 1963).

This theory hypothesises that the value of the firm will be maximised where debt is deployed in preference to equity until a point is reached where the present value of the interest tax shields are maximised, after taking into account potential bankruptcy costs. In this regard, beyond a certain level of debt the value of a firm will begin to diminish as the present value of financial distress will begin to marginally exceed the present value of the tax shield accrued as a result of an additional unit of debt. The theory implies that there is an optimal debt to equity ratio in a company, at which point an additional unit of debt results in value destruction, and this is exacerbated the more leveraged the company becomes. This negative effect of incremental debt occurs as a result of the present value of financial distress exceeding the benefit to be derived from the interest tax shield of the additional debt unit.

Flowing from this logic, companies would seek to determine what the optimal debt to equity ratio is in order to maximise their firm's value. While the precise and specific optimal ratio may fluctuate marginally due to changes in some of the underlying drivers e.g. interest and tax rates, the optimal capital structure should be observable through the listed share price or other valuation process within a clearly defined range. Significant deviations from this range are likely attributable to adjustments costs incurred in rebalancing funding sources towards the derived optimal capital structure.

Myers (2001) begins by acknowledging a number of admirable aspects of the static trade off theory. Firstly, the theory has intuitive appeal to financial practitioners who appreciate the value of the tax shield derived from the deductibility of interest expenses, and who display caution towards

excessive debt levels. Secondly the static trade off theory is supported by observations to the effect that mature companies that hold tangible assets would be expected to borrow more than mature companies that predominantly hold intangible assets or are asset light. This would be the case for instance in a manufacturing company compared to a pharmaceutical research company. This relationship of higher leverage in fixed asset rich companies in comparison to fixed asset light companies has been confirmed in the academic literature, and support the proposition in the static trade off theory that the costs of bankruptcy and related financial distress would be higher for asset light companies. Thirdly, the static trade off theory appears to be supported by listed stock price movements. Specifically, stock prices tend to increase when a company increases leverage and decrease when leverage declines. Similarly, stock issuances have the effect of driving down share prices, whilst share buybacks are inclined to increase share prices (Smith, 1986). This 'event studies' phenomenon implies that investors have an appreciation of the value of the tax shield and respond accordingly in terms of their valuation of the related equity.

The criticisms of the static trade off theory are multi-pronged. Firstly, the theory does not predict the outcomes of the 'event studies' phenomenon detailed above. A more robust and comprehensive static trade off theory would be expected to forecast that managers would routinely intervene to update their capital structure to approach optimality and therefore maximise the value of the firm. In seeking to maximise value these managers would seek to avoid and control value-destroying adjustments to the capital structure. The 'event studies' appear to indicate two clear aspects. The first is that financial practitioners make decisions related to the capital structure, such as the issuance of new stock, that are likely to compromise the value of the firm's stock. As such the managers are not consistently managing the capital structure with a view to maximising the firm's value. The latter point may therefore indicate that managers are not specifically focused on managing the capital structure to maximise the value of the firm, undermining a central tenet of the theory.

Another criticism of the static trade off theory relates to evidence in the academic literature that shows negative correlations between firm profitability and debt levels i.e. high profit firms display lower levels leverage, and low profit firms display higher levels of leverage (Baskin, 1989). These studies appear to contradict the static trade off theory as high profit firms would be expected to be more highly leveraged as they are in a more favourable position to take advantage of the tax shield that

would accrue, and due to the reduced likelihood of bankruptcy and financial distress. Conversely low profit firms would be expected to aim for lower debt levels as the scope for enjoying a tax shield is limited due to lower profitability, and elevated levels significantly increase bankruptcy risk. The static trade off theory fails to adequately account for this observation in the practice of capital structure formulation, and is inadequate in clarifying any given firm's choices and decisions.

2.2.1 The tax advantages of debt and agency benefits of debt

2.2.1.1 The tax advantages of debt

The benefits of debt over equity in capital structure arrangements is premised on the argument put forward by Modigliani and Miller (1963) on the tax efficiency that arises from debt. Taxation laws and regulations allow for the interest expense incurred on debt to be offset against profit generated by a firm. This allowance has the effect of reducing the firm's taxable income and culminating in a tax shield or an effective lower rate of tax. Such a tax benefit does not generally accrue to dividend declarations on equity stakes. It is argued that firms would take advantage of this favourable attribute of debt, implying greater leverage.

Two sets of complementary arguments are put forward by Taggart (1985) regarding the tax advantages of debt. The first of these contends that firms will enjoy a net tax advantage from debt where corporate tax rates exceed personal tax rates. This advantage is partly attributable to the fact that while the tax is deductible as an expense at a firm level, it will be limited in terms of its deductibility at a personal tax level. This contention challenges the Modigliani and Miller (1963) hypothesis as the tax benefits that accrue to the firm will be offset in part by higher personal income taxes. As a result, private individuals will require a premium on debt instruments to be compensated for higher tax obligations, violating the proposition that capital structure is irrelevant (Graham, 2003). The second point argues that in the period post 1945 leverage has increased on account of two key factors, namely, the tax system and elevated inflation (Taggart, 1985).

Fama and French (1998) also challenge the irrelevancy of the capital structure argument contending that there is a positive correlation between the profitability of a firm and its level of leverage, and that the level of profitability is the main determining factor for leverage. While this argument positions capital structure arrangement as an outcome as opposed to an originator, the premise made is that capital structure and debt levels in

particular are relevant in determining a firm's value. DeAnglo and Masulis (1980) observed non-debt tax shields such as tax allowances on research and development, capital investment, and tax holidays, as significant contributors to capital structure, in effect arguing that the capital structure does matter and contradicting the debt/equity irrelevancy theory of Miller (1977).

Due to the fact that different national jurisdictions have different tax codes, the impact of interest deductibility and other tax concessions in influencing the tax shield and potentially the firm capital structure, is expected to differ from one country to another. Corporate tax rates for the 2015 fiscal year were South Africa (28%), Zimbabwe (25.75%) and Mozambique (32%), and the sophistication and tax environment in each of these jurisdictions is diverse. It is expected that South African based firms will have a greater use of debt in their capital structure on account of more sophisticated and deeper debt markets, while firms in Zimbabwe and Mozambique will have lower leverage in part as a result of shallow and less developed debt markets.

2.2.1.2 Agency benefits of debt

While the use of debt has the benefit of accruing tax benefits, this is not the only advantage from greater leverage. In a significant number of large modern companies there is a separation of the owners of the firm and the management of the firm. Frequently differences occur between the owners and the managers regarding the application of free cash flows that are generated. Jensen and Meckling (1976) and Jensen (1986) suggest the usage of debt as a measure to reduce agency conflicts between shareholders and managers within a firm. Debt has the benefit of reducing agency conflicts by prescribing that a certain and potentially significant proportion of the free cash flows must be directed towards the repayment of interest arising from debt obligations. This has the effect of reducing the scope of discretion management may enjoy regarding free cash flows, and as a result also reducing potential agency conflicts between the owners and management of the firm. Without the restraining effect of debt the management of a firm has greater scope to extract as much value and wealth from the firm for themselves and to the detriment of shareholders. In addition, managers may engage in commercial activities that may destroy or compromise shareholder wealth such as overinvestment in assets, investment in activities that do not yield a sufficient return or are unprofitable, or simply be complacent with an idle balance sheet of capital that is not deployed. The agency conflicts that arise due to the separation of the ownership and management of the firm are exacerbated by the

diffusion of ownership in larger companies. Diffuse ownership may result in smaller shareholders being less willing to bear the cost and make the investment to monitor the management team. This may have the overall effect of reducing the oversight that owners conduct over management (Gillan and Starts, 2003).

In summary debt works as a disciplinary tool on the activities of the management team because debt providers can initiate bankruptcy proceedings in the event of a default (Harris and Raviv, 1990). Debt may also motivate managers to work harder and create an environment where managers are compelled and motivated to make more rigorous investment appraisals and decisions (Lasfer, 1995). The disciplinary benefits of debt on management will be particularly beneficial in those firms that are highly free cash flow generative and have very limited options in terms of where excess cash can be further invested (Jensen, 1986). Conversely for firms with very little free cash flow the potential benefits derived from debt in reducing shareholder-manager agency conflicts will be very limited, and may actually exacerbate agency conflicts between the shareholders and the providers of debt capital. As debt increases and owner-management agency costs are curtailed, agency costs between the owner and providers of debt capital will rise. As a result, the optimal capital structure of the firm will be arrived at by a consideration of the trade-off between the agency costs pertaining to owners, management, and debt capital providers (Jensen and Meckling, 1976).

2.2.2 The costs of debt

Miller and Modigliani (1963) hypothesised that a firm could maximise its value by maximising its debt levels as described in section 2.2.1 above. One of the key assumptions underpinning this hypothesis was the existence of perfect capital markets. In reality, firms must contend with the real possibility of bankruptcy and the agency costs that arise on taking on debt. A company therefore needs to weigh these costs and arrive at a conclusion as to optimal debt levels where the benefits that accrue from taking on debt are balanced with the costs of bankruptcy and debt related agency conflicts. This section considers the contribution of debt to the costs of financial distress and agency conflicts.

2.2.2.1 The costs of bankruptcy

The potential costs of bankruptcy that arise from the utilisation of debt are the real risk that if a firm fails to service its debt obligations, providers of debt capital can initiate liquidation proceedings potentially resulting in the

dissolution and discontinuance of the firm (Jensen and Meckling, 1976). As a result stakeholders including management, owners, and debt capital providers may suffer financial losses. Bankruptcy costs can be divided into two broad categories, namely direct costs and indirect costs. Direct costs of bankruptcy relate to the legal and administrative costs incurred in the shutting down and liquidation of a bankrupt company.

Direct costs may be compounded by the fact that management may have poor incentives to run efficiently a company that is in the process of liquidation. In addition shareholders may be perversely incentivised to undertake excessively risky projects in the hope of avoiding or reducing bankruptcy costs, which may impact adversely on the potential losses suffered by providers of debt (Cornelli and Felli, 1997). Vander Wijist and Thurik (1993) define bankruptcy costs as the difference between a firm's operating value and its liquidation value. This would imply that firms facing an elevated risk of bankruptcy would seek to mitigate this by having lower debt levels. Conversely firms facing lower risks of bankruptcy would use this advantageous situation to take on a greater degree of debt (Fischer et al, 1989). This observation is corroborated by DeAnglo and Masulis (1980), who argue that firms with marginally higher bankruptcy employ less debt as a result. Smaller firms however face higher bankruptcy costs than larger firms resulting in the larger firms taking on greater levels of debt as it is cheaper (Warner, 1977).

The indirect costs of bankruptcy are twofold. In the first instance a firm in financial distress signals a very negative message to the commercial community. This may result in third parties being reluctant to engage in business activities with the distressed company (Brealey and Myers, 2002). The ostracised company may lose customers, suffer employee resignations, incur reputational harm and brand erosion, and lose credit lines from important suppliers. A firm in financial distress and with large existing debt obligations may trigger the 'debt overhang' problem (Myers, 1977). The debt overhang problem relates to the domino effect that may be unleashed where a firm finds itself in financial distress, resulting in debt capital providers seeking to mitigate any losses by enforcing priority repayment of the debt at the expense of investment and operational expenditure. While these actions may reduce the exposure of debt providers, they result in a cost to shareholders as a result of the investment opportunities that are forfeited as a result of prioritising capital towards debt settlement Consequently firms with stable and consistent earnings will enjoy lower bankruptcy costs, whilst firms with more volatile earnings will suffer higher bankruptcy costs (Bradley et al, 1984).

In the context of project and infrastructure finance ventures the costs of bankruptcy would be expected to be extremely high. This is in part due to the fact that the liquidation value derived from assets would be relatively low as frequently assets are bespoke to a particular venture with very limited alternative uses. The high bankruptcy costs may be ameliorated in part by the consistency of earnings on established and operational infrastructure projects such as toll roads and power plants with stable usage patterns and binding power purchase agreements (Lasfer, 1995).

2.2.2.2 Agency costs of debt

As highlighted in 2.2.2.1 above the incurrence of debt results in a conflict between shareholders and debt capital providers due to the incentive the shareholder has to invest sub-optimally. Jensen and Meckling (1976) observe how agency conflicts arise due to shareholders being incentivised to extract benefits at the expense of debt capital providers. This perverse incentive occurs because shareholders may overinvest in risky projects. In the event that the riskier projects succeed the shareholders are likely to enjoy a disproportionate portion of the profits that result. This scenario results in potential overinvestment in risky projects driven by the shareholders. In the event that the riskier projects fail, losses are shared between shareholders and debt capital providers, with the latter sharing a disproportionate portion of these losses. Because debt capital providers expect such expropriation behaviour on the part of the shareholders, they respond by demanding a premium on the debt capital provided in compensation. This interaction between shareholders and debt capital providers and its impact on debt pricing is known as the agency cost of asset substitution, and will be more acute for firms in financial distress. Where the debt capital providers capture a disproportionate share of proceeds from a firm relative to shareholders, this results in a perverse situation where shareholders are dis-incentivised from investing in new projects even where these enjoy a positive net present value. This scenario culminates in a potential underinvestment problem. The agency conflict between shareholders and debt capital providers arises out of the fact that shareholders enjoy limited liability in the firm. This means that their equity capital investment exposure remains fixed even where debt levels are increased. Shareholders therefore have the potential to enjoy returns from riskier projects initiated that are funded by debt, while their equity exposure remains unchanged. Conversely, debt capital providers become liable to a higher risk of financial distress in the firm, and higher debt exposure.

The substitution problem and underinvestment problem are acute in highly leveraged firms with a higher probability of financial distress and bankruptcy. Myers (1977) argues that the underinvestment problem can be monitored by paying attention to the firm's debt capacity reserve, particularly for high growth firms. In this regard high growth firms should ideally finance investment projects using equity as this allows them the flexibility and opportunity to undertake desirable positive net present value projects in the future, without the constraint of excessive debt. Myers (1977) also proposes the mitigation of the asset substitution problem through the issuance of short-term debt as opposed to long-term debt. Shorter-term debt has the effect of reducing the asset substitution incentive for management and discouraging sub-optimal investment. Asset substitution may also be curtailed by the issuance of debt secured by underlying project assets. This will limit the firm's application of the debt funding to prescribed assets and ventures, reduce the agency costs of asset substitution, and potentially negate the debt pricing premium applied as a result of agency cost fears by debt capital providers. Companies with large fixed asset stock and stable and predictable profits may implicitly be able to raise debt capital at more competitive rates, as bankruptcy costs are reduced by the possibility of liquidating the fixed assets at reasonably attractive commercial terms. Equally, companies whose asset value resides predominantly in intangible assets may incur higher costs on debt funding as the value of intangible assets would be significantly eroded in the event of a liquidation, and the monetary value that would be realised would likely be severely discounted (Titman and Wessels, 1988). The effect of this observation on firms with a high intangible asset stock would be to shift them towards a preference for equity financing.

In summary the static trade off theory observes the various benefits and costs that arise as a result of the use of debt. Initially, the uptake of debt results in the benefits accruing to the firm exceeding the costs incurred on account of higher leverage. At a certain optimal debt/equity mix the benefits derived from debt are exhausted and thereafter any benefits that accrue from an additional unit of debt are exceeded by higher marginal costs of debt. Similarly, if a firm has leverage below the optimal debt equity mix, it concedes marginal benefits of debt that would have accrued with higher leverage. The extremely high costs of financial distress and bankruptcy may in part explain why firms utilise less leverage than would in theory be optimal in terms of the static trade off theory.

Myers (1977) proposes that deviation for the optimal capital structure may be due to the high transaction costs associated with recalibrating the firm's

capital structure. Accordingly, firms may be resigned to leave sub-optimal capital structures unchanged to avoid these transaction costs. Some evidence suggests that firms may gradually move towards the optimal capital structure. The following three sections look at the empirical evidence of the static trade-off theory in both developed and developing markets, and then specifically at the empirical evidence from Southern Africa, to establish what factors contribute to the determination of an optimal capital structure and how this evolves over time.

2.2.3 Empirical evidence on determinants of capital structure based on the static trade off theory

2.2.3.1 Empirical evidence from developed markets

The existing research on the static trade-off model in developed markets has yielded results that are relatively similar and consistent. This appears to indicate that the variables and determinants of capital structure in developing markets are largely the same.

In a study based on industrial companies in the USA Titman and Wessels (1988) extended the work on capital structure in developed markets measuring short-term, long-term and convertible debt. Their study compared these debt levels to the collateral value of assets, non-debt tax shields, growth, uniqueness of business, industry classification, firm size, and volatility of earnings. The results of this study suggest firms with unique/specialised products have low debt rates and smaller firms are inclined to use more short- term debt than larger ones. Smaller firms may exhibit lower debt levels and shorter dated debt durations due to the transactions costs associated with longer term and higher debt levels. The study found no evidence to support theories that predict debt rates are related to firms expected growth, non-tax shields, volatility of profitability, or collateral value of assets. The authors also confirmed that more profitable firms have less debt, and conclude that transaction costs are an important determinant of capital structure particularly for smaller firms.

Rajan and Zingales (1985) conduct a comparative study of the Titman and Wessels (1998) paper focusing on G-7 countries. The former authors enquire as to whether the capital structure in other developed countries is driven by the same factors influencing capital structure in the USA. The study analysed the relationship between leverage and tangible assets, market to book ratio, firm size and profitability. It found that firms with more collateralised assets were not highly levered. In addition, profitability and market to book ratio were negatively correlated to leverage, and the size of

the firm did not appear to have an effect on leverage. Rajan and Zingales (1985) conclude that in the G-7 countries the determinants of capital structure are similar to those determinants in the USA.

The work of Rajan and Zingales (1985) was extended by Bevan and Danbolt (2002) who tested the capital structure determinants in non-financial UK companies. Bevan and Danbolt (2002) focus on four measures of leverage namely, non-equity liabilities to total assets, total debt to total assets, total debt to capital, and adjusted debt to adjusted capital. The four measures are regressed on market to book value, firm size, profitability, and tangibility of assets. The study found that the determinants of gearing differed significantly depending on which debt measures were used. The authors also highlight that the definitions applied to the debt measures may influence the results of the determinants of leverage. This observation is further highlighted in a later study by the same authors that submits that the methodology used to analyse sample data can significantly influence findings on leverage and its determinants. This is particularly the case where different studies are inconsistent in sample data compilation regarding controls for firm and time-specific heterogeneity (Bevan and Danbolt, 2004). Using the same measures of market to book value, firm size, profitability, and tangibility of assets the later study finds larger firms have higher leverage and mobilise both long and short term debt more than smaller firms. Furthermore, leverage is positively correlated to the tangibility of assets, while profitability is negatively correlated to leverage, and profitable firms have a greater propensity towards short-term debt than less profitable firms.

A different study of the determinants of capital structure the UK found that the explanatory variables of earnings volatility, tangibility of assets, firm size, profitability, non-debt-tax shield, uniqueness and industry classification account for the level of leverage. The study found that growth as a determinant in the UK found limited support in contributing to higher leverage implying limited debt to fund growth in the UK (Banerjee et al, 2000).

The current studies on determinants of capital structure in the developed world suggest leverage can be explained by profitability, asset structure, firm size, non-debt tax shields, growth opportunities, and earnings volatility. Despite some variations, there appears to be a general consistency across the studies regarding the drivers and determinants of capital structure. This may in part be due to similar institutional arrangements in the legal frameworks, sophistication of capital markets (and related financial and institutional infrastructure), and level of socio-

economic and political development. The following section assesses a number of the empirical studies in developing markets where the contextual environment differs markedly from developed countries.

2.2.3.2 Empirical evidence from developing markets

The capital structure dynamics in developing countries are investigated in a study on a sample of large listed companies developing countries by Kunt and Maksimovic (1994). The study covers 10 countries namely, Brazil, India, Jordan, South Korea, Malaysia, Mexico, Pakistan, Thailand, Turkey and Zimbabwe. The authors find that despite large disparities in the depth and sophistication of capital markets between the developing countries selected and the United States, the variables that determine the degree of leverage are the same. In the developing countries, leverage appeared to be more forcefully influenced by agency theory than tax based theory. The industry, nature of firm assets, and firm liquidity offered better explanations of both short and long term debt levels than the tax implications of debt, the size of the company and the company's growth rate. High net fixed asset firms were observed as having lower levels of leverage implying that other more influential factors drove decisions related to gearing, and that debt capital markets in developing countries function differently from those in developed markets.

Booth et al (2001) conduct a similar study to Kunt and Maksimovic (1994) and consider whether the theories relating to capital structure in developed countries are applicable in developing countries. The study includes a sample of companies from Brazil, India, Jordan, South Korea, Malaysia, Mexico, Pakistan, Thailand, Turkey and Zimbabwe. The authors analyse the total debt ratio, long-term book debt ratio, and long-term market debt ratio relative to the average tax rate, assets tangibility, business risk, size, profitability, and market to book ratio as explanatory variables. The findings of the study showed that the profitability of the firm was negatively correlated to the debt levels. Firms with more tangible assets also had higher long term debt ratios and lower total debt ratios. The conclusions of Booth et al (2001) were that the debt ratio in developing countries was influenced by the same variables as those in developed countries. In addition, developing country firms have significantly lower long-term debt ratios. Finally, the longer-term debt levels in developing countries are probably attributable to significantly higher agency costs in these markets.

In a study focused on countries in Central and Eastern Europe, Delcoure (2007) finds a positive correlation between firm leverage ratios, asset tangibility, tax rates and tax shields. It also identifies negative leverage

between leverage and profitability in the selected countries (Czech Republic, Poland, Russia, and Slovakia). The results of the study also reveal baffling findings regarding leverage ratios, firm size and earnings volatility between on account of different legal, economic, social and business contexts. The conclusion of the study is that the mainstream capital structure theories of static trade-off theory, pecking order theory and agency theory do not fully explain the capital structure in the sampled countries.

Huang and Song (2005) conduct a study in which they enquire as to the determinants of capital structure in China. Their findings reveal that the long- term debt ratio, the total debt ratio, and total liability ratio decrease with higher profitability, managerial ownership, and non-debt tax shields. Conversely leverage increases with the size of the firm and the tangibility of the firm's assets. The authors also observe that the tax rate positively impacts on the total debt ratio and long-term debt ratio, whilst finding high growth firms to exhibit lower leverage. These findings confirm an earlier study in China by Chen (2004) that argues for a "new pecking order" theory on account of the characteristically different institutional environment in China.

Bhaduri (2002) identifies key determinants of capital structure in India. Larger firms have a greater propensity towards long-term debt whilst smaller firms are more inclined towards shorter-term debt. For both large and small forms, capital structure is strongly influenced by the tangibility of assets, growth, the firm's size, uniqueness, and cash flows. High cash flow firms exhibiting market uniqueness displayed lower leverage, while firms with a rapidly growing asset base exhibited higher leverage.

In summary, the studies in developing countries appear to show that the determinants of capital structure in developing markets are similar to those in developed markets. The socio-economic, legal, political, and business context however has a strong influence in how these determinants manifest in the capital structure. Agency theory variables appear to play a greater influence in shaping the capital structure in developing countries.

The following section assesses empirical studies performed in Sub-Saharan Africa specifically. Sub-Saharan Africa is characterised by nation states that frequently have economies in transition and characterised by high degrees of uncertainty and complexity, inequality, and rudimentary, narrow and shallow capital markets.

2.2.3.3 Empirical evidence from Sub-Saharan Africa

In their study of listed firms from the stock exchanges of South Africa, Zimbabwe, Nigeria, Kenya and Ghana, Gwatidzo and Ojah (2009) investigate corporate capital structure in Sub-Saharan Africa demonstrating how firm characteristics and cross-country institutional differences influence capital structure. The study finds firms in African countries to be as leveraged as other emerging markets such as Mexico, Thailand, Brazil, South Korea, Malaysia and Turkey. African firms were inclined to place reliance on internally generated finance, and where external finance is used it is inclined towards shorter term funding. This may indicate support for the pecking order theory (see section 2.3 below) in African markets and the use of short-term finance may be strongly influenced by higher agency costs. A positive correlation is noted between the firm's profitability, size, asset tangibility and age (maturity), and its leverage. The authors submit that firm specific factors may also act as private market remedies for inadequate institutional infrastructure in the countries analysed, with South Africa a possible exception. As a result, the capital structure of firms in Africa is strongly influenced by reputation, collateral, and the availability of in internally generated profits. The influence of a number of country factor determinants on leverage were also observed by the authors. Kenyan and Nigerian firms have lower debt levels in comparison to South African firms possibly due to less developed debt markets. The results for Ghana were inconclusive while Zimbabwe was excluded from this comparison due to insufficient data. A negative correlation was observed between profitability and both short term and long-term debt perhaps indicating African firm's preference for preferring internally generated capital. Asset tangibility was positively related to total and long term debt but negatively related to short-term debt. Overall Gwatidzo and Ojah (2009) conclude that Nigeria, Ghana, Kenya, and Zimbabwe firms have lower leverage on account of inadequate institutional infrastructure in debt markets. As such improvement in the institutional infrastructures in Africa has the potential to enhance the capital structure decisions of firms.

Adesola (2009) investigates the determinants of capital structure in 27 Nigerian listed companies over a period spanning 1996 to 2006. The findings of the research are inconclusive with both the static order theory and pecking order theory appearing to play a significant role in corporate financing choice. The pecking order theory seems to exert marginally more influence. Net asset tangibility does not determine leverage in this study, which is inconsistent with Gwatidzo and Ojah (2009), Booth et al (2001),

and Delcoure (2007). Adesola (2009) confirms the strong and significant influence of agency theory in capital structure consistent with the observations of Chen (2004) and Booth et al (2001).

In a recent study De Wet and Gossel (2016) explore the factors influencing capital structure in South African firms by way of a survey of 33 chief financial officers of Johannesburg Stock and Securities Exchange listed firms. They conclude that the pecking order and static trade off theories are both equally regarded. Smaller companies are inclined towards the pecking order theory while larger firms appear more likely to follow the static trade off theory. South Africa is more inclined towards the static trade off theory than other developing markets perhaps due to enjoying deeper and more sophisticated capital markets, and banking and financial system. Importantly the study was able to rank the most important factors influencing debt decisions into three categories. The first category of the three most significant factors was made up of the level of forecasted cash flows from investment projects that the debt would be used to fund, the volatility of earnings and cash flow, and financial flexibility. The second category included the tax advantage of interest deductibility, the potential costs of bankruptcy, and the firm's credit rating. The final category included factors that were not considered important by firms such as supplier concern that the firm would go out of business, and using debt to ensure management worked hard and remained disciplined. Smaller firms also limited their debt relative to larger peers to enable profits to be captured by shareholders as opposed to transfers to debt providers. The observations in the final category imply the disproval of agency theory but this may not be the case as survey participants my be reluctant to use debt despite its disciplinary effect on management and they may be an aversion to candidly admit to the use of debt to control managers. In conclusion the De Wet and Gossel (2016) study observed that a large number of chief financial officers indicated a target ratio that is flexible, which can support both the static trade off and pecking order theories.

In summary the empirical studies on the static trade off theory and capital structure in countries in Sub-Saharan Africa explained above, highlight the three key determinants of capital structure that differ with the developed world, and even other developing countries. The first is institutional and infrastructure deficiencies in the form the banking and financial system, capital markets, and legal systems. Secondly is the shallowness and lack of sophistication in capital markets. Thirdly are the higher agency costs that arise in part as a result of the first two points. As a result of these

three significant contextual differences African capital structure decisions are comparatively more reliant on firm specific attributes.

2.3 Pecking Order Theory

Modigliani and Miller (1963) argue that in a perfect market investors receive perfect information regarding all issues affecting capital issuances. In reality however this assumption is fallacious. This is because the managers of the firm will have more and better information regarding its activities and prospects than external investors. As a result of this differential information asymmetry begins to play an important role in the capital structure formulation as capital is raised from external equity and debt providers, as well as being generated internally in the firm by way of retained earnings. Myers and Majluf (1984) argue that there is in inherent mispricing in new shares issued by the firm on account of information asymmetry. Investors are likely to be prepared to pay less for fresh equity issues because management will be unable to credibly communicate the full upside prospects of the firm in a manner that is fully captured into the price of the share issue. Consequently, investors will demand a premium to invest or the firm will only be able to successfully raise capital if it furnishes a discount to the equity price. Due to information asymmetry outsiders will have difficulty in differentiating between good and bad investments, and will interpret a firm's decision to issue fresh equity negatively and price the shares accordingly. The effect of the anticipated behaviour of potential investors above may result in a firm not issuing equity even where the cost of this capital is exceeded by the return it has the potential to generate culminating in an underinvestment problem. In order to circumvent this dilution of ownership and value that arises fur to information asymmetry, a firm will opt to raise debt as opposed to issue equity.

Consistent with the argument Myers (2001) contends that a firm will only issue equity where the costs of debt are excessively burdensome. Such a scenario may arise where the firm is already highly leveraged and incurring greater debt would result in a significant increase in potential financial distress and bankruptcy costs. The author demonstrates how fairly priced debt is preferred to equity issuances by firms, concluding that debt is the preferred and default leading option of capital sourcing. Firms are as a result expected to issue equities when the share price is higher as this reduces the asymmetry costs, and are more inclined towards debt if the share price is subdued as this scenario magnifies asymmetry costs.

The Myers (1984) and Myers and Maljuf (1984) rationale for the pecking order proceeds as follows. A firm obtains capital from three sources, namely, internally generated profits, debt, and fresh equity issues. Companies are compelled to prioritise their sources of funding, and in so doing there is a preference for internally generated profits, then debt, and finally equity. In order to conform to this ideal the firm needs to ensure that the size of the dividend declaration is aligned to its forecast investment initiatives. This exercise is made more difficult on account of the fact that the distribution of dividends as a proportion of after tax profits may be sticky and relatively inflexible. As a result of sticky dividends and fluctuating profitability, internally generated profits may exceed investment requirements, or be insufficient. Where internally generated profits are insufficient the firm will resort to debt funding followed by equity issuance, in that order of preference. In pecking order theory no optimal capital structure exists and the firm's capital structure reflects the firm's reliance on debt levels compared with equity (internally generated and externally raised). The capital structure at a point in time is therefore an aggregation of historical decisions on the firm's funding arrangements (Myers 1984). A firm will not have a target capital structure but will follow a pecking order of incremental financing choices in the order of internally generated profits, debt, and finally equity.

A study by Fazzari et al. (1988) submitted that it is not only information costs but also transaction costs and agency costs that induce the preference for capital sources sequenced in the pecking order theory. The following section will consider transaction and agency costs in the construction of the pecking order theory.

2.3.1 Transaction costs

The first proponent of the pecking order theory ascribed the preference hierarchy for capital to transaction costs (Donaldson, 1961). Transaction costs are generally incurred in two components being, the expenses of the agent enabling an issue, and related administration expenses (accounting, tax, legal etc. (Oliner and Rudebusch, 1992). Transaction costs may also be higher for smaller capital raisings and implicitly smaller firms, due to the erosion of economies of scale. This implies that smaller firms will be more inclined to follow the pecking order theory.

2.3.2 Agency costs

Agency costs are incurred in the pecking order theory on account of the separation of the management and ownership of the firm (Jensen and

Meckling, 1976). These costs manifest themselves in the form of monitoring costs by shareholders, bonding costs by the manager to give assurance that he will not act in a manner that compromises the shareholder's interests, and residual costs that capture how the cost to the shareholder if the manager had acted as a shareholder would have. The effect of agency costs is to increase the cost of funding from external sources and result in internally generated funding becoming the cheapest funding source, or comparatively more competitive. The impact of these agency costs will be to exacerbate the asset substitution problem and underinvestment problem introduced in the static trade-off model. In addition, firms with comparatively higher agency costs, will be more inclined towards sourcing capital from internally generated profits.

2.3.3 Criticisms of the pecking order theory

The pecking order theory has been criticised as being too narrow and prescriptive to capture the capital structure decisions of firms. Adedeji (1998) argues that the pecking order theory fails to consider other significant factors and influences on a firm's funding choices including interest rates, the availability of external funding sources, and government intervention in capital markets. This critique is supported by Cull and Xu (2005) who posit that large investments are lumpy and occur intermittently. Internally generated capital for such investments may therefore be insufficient and compel a blend of internal funding and external funding to execute a project. These criticisms appear particularly relevant in 2016 where interest rates in a number of developed countries are at decade lows (and in some cases actually negative), on account of monetary policy and public policy interventions. This situation may actually render debt funding cheaper than internally generated profits.

Myers and Majulf (1984) and Myers (1984) argue that internally generated profits enjoy a preference as a source of funding because they reduce agency costs and the adverse selection problem is challenged by Adedeji (1998), Baskin (1989), and Allen (1993). The latter argue that the preference for internally generated profits is more attributable to a desire to maintain the existing control structure by avoiding equity issues, and to circumvent the conditions and capital market discipline inherent in debt funding. This observation is supported by others including Jensen and Meckling (1976) and Fazzari et al (1988).

Fama and French (2005) argue that the shareholding and control structures motivations posited by Adedeji (1998), Baskin (1989), and Allen (1993) in critiquing the pecking order theory may in fact be moot. This is

because these concerns can be ameliorated, by issuing new equity capital via methods that substantially maintain the existing shareholding such as rights issues. Issuing shares to management may also reduce the costs of information asymmetry, as management is likely to have better information of the firm compared to external investors. Graham et al (2004) further argue that where managers own shares in the firm, the interests of the shareholders and the managers will be better aligned and likely reduce agency costs. These factors contribute significantly to the reduced need to raise debt capital by firms, and also act as a useful method in mitigating agency conflict (Jensen and Meckling 1976).

2.3.4 Empirical evidence on the pecking order theory

There are a number of studies that have sought to establish the veracity of the pecking order theory. The models applied in this regard can be broadly categorised into two groups. The first group study the applicability of the pecking order theory by investigating the degree to which internal funds are a determinant of changes in the debt level and includes Shyman-Sunders and Myers (1999), and Frank and Goyal (2003). The second group examines the veracity of the pecking order theory in terms of its ability to predict explanatory variables including tangibility, profitability, size, and growth, and includes Tong and Green (2005), Allen (1993), Baskin (1989), and Adedeji (1998). These studies argue that a negative correlation between profitability and leverage support the pecking order theory and are consistent with most studies performed over the past half-century in the regard (Baskin 1989).

Countering the above studies and conclusions are contributors including Hovakiman et al. (2004) who argue that the negative correlation between profitability and leverage is not due to the level of profitability. These protagonists argue that profitability may initially cause leverage to diverge from its targeted level. This divergence may persist because firms have no incentive to revert back to the targeted capital structure, in part due to the transaction costs that may arise. This section presents the views of both groups beginning with the group that tests the veracity of the pecking order in terms of its ability to predict explanatory variables including tangibility, profitability, size, and growth.

In a study using data from public companies in the USA Taggart (1985) enquires as to the determination of capital structure in these firms. The enquiry reveals that capital structure and debt levels are strongly related to capital investment, and debt is implicitly incurred where internally generated funds are insufficient. The study concludes by asserting that

transaction costs induce an order of preference firstly for internally generated funds, followed by debt funding where retained earnings are exhausted or insufficient, and finally equity issues. Taggart (1985) explains this preference on the basis of the attempt to mitigate transaction costs that are highest where funds are raised from external sources on account of asymmetric information. This study supports the pecking order theory. Support for the pecking order theory is given by Baskin (1989) win another study of USA firms that revealed despite the incremental risks and potential costs of financial distress and bankruptcy that accrue with leverage, debt remains a more elastic and accessible source of capital than equity. This preference for debt over equity can be ascribed to transaction costs, control considerations, and the costs of asymmetric information, supporting the pecking order theory.

Using data from the Australian market, Allen (1993) replicated the Baskin (1989) study and concluded that there was a significant and negatively correlated relationship between profitability and leverage. Allen ascribes this occurrence to firms seeking to preserve the flexibility to deploy external funding by in the first instance not resorting to debt. Firms use equity issuances only as a third preference after retained earnings and debt on account of higher transaction costs due to asymmetric information. As a result, the degree of leverage will largely be determined by the gap between retained earnings and capital required to fund identified investment opportunities. These findings are consistent with and support the conclusions of Baskin (1989).

Adedji (1998) builds on the earlier studies of Allen (1993) and Baskin (1989) applying the analysis to the UK market, and considering the possible interaction between investment, leverage, and the dividend pay-out ratio. The study concludes that the dividend pay-out ratio is negatively correlated to investment levels whilst being positively correlated with leverage. In addition, no significant relationship is found between leverage and investment. This supports the findings of Allen (1993) and Baskin (1989) in the USA and Australia respectively that debt funding is a secondary choice to internal funding, and is resorted to when retained earnings are fully utilised.

In a similar study to the above using a sample of 42 Chinese firms Tong and Green (2005) observe a negative correlation between profitability and leverage, whilst acknowledging a positive relationship between leverage and dividend pay-out ratios. These findings support the pecking order theory, and despite the small sample size, support the applicability of the

theory in the Chinese market. This concludes the second group of academic contributors to the pecking order theory.

This section reviews the second group of contributors to the pecking order theory beginning with Frank and Goyal (2003). The authors argue that the studies of Shyam-Sunders and Myers (1999) are biased due to the fact that the sample is disproportionately represented by larger firms. In this respect the Goyal study posits that the pecking order theory is less applicable and resonant to explain the capital structure decisions of smaller firms, and that universal application of results obtained predominantly from large firms inflate the theory's applicability. This criticism of the Shyam-Sunders and Myers (1999) study is affirmed by Adjedeji (2002) who warns of a potential bias in support of the pecking order hypothesis. These criticisms are dismissed by Sunders and Myers (1999) in the original study, on the basis that any bias in this regard would be insignificant to the results outcome.

Other critics of Shyam-Sunders and Myers (1999) argue that the pecking order theory either ignores or places insufficient emphasis on a number of other key determinants of capital structure. These include that the leverage in a firm may be distorted by other considerations e.g. in project and infrastructure finance sponsors/shareholders may impose high leverage on a very profitable project to curtail management discretion. As a result, the negative correlation between profitability and leverage in the Sunders and Myers (1999) argument will be rendered redundant. Equally, leverage may also be constrained by the non-availability of debt funding, and a consideration of potential bankruptcy and financial distress costs. In 2016, decade low interest rates may result in debt being cheaper than retained profits as mentioned earlier. Finally, companies may take advantage of elevated equity prices to issue shares in accordance with the market timing theory, altering their capital structure opportunistically. The major criticism of the Sunders and Myers (1999) model is that it does not capture these important determinants.

Using data from the UK market and Spanish markets (Benito 2003) examined the inclination of firms to issue debt and equity relative to its financial characteristics such as cash flow and investment. The author finds that firms with higher cash flows have lower leverage, and those with higher investment levels have higher leverage. In addition, profitability was found to be positively correlated with leverage and the results supported the underlying hypothesis in the pecking order theory as a superior explanatory model than the static trade-off theory.

Mayer and Sussman (2004) use data from a combination of large and small firms in the USA and find evidence consistent with both the pecking order theory and the static trade-off theory. The study revealed that small firms were more inclined to use new equity, while large firms had a preference for debt when making significant new investments. New equity issues are generally associated with loss making firms but where firms suffered losses and already had high leverage, potential bankruptcy and financial distress costs inclined them towards equity. In line with Myers (2001) who argued firms revert to equity where costs of debt are high, Mayer and Sussman (2004) conclude that in the long run firms revert to pearlier levels of leverage. The conclusion of this study is that both the pecking order and static trade-off theories are valid. Used concurrently the pecking order theory helps to explain short to medium term capital structure arrangements, while the static trade-off theory explains long-term capital structure equilibrium.

In a survey conducted by Beattie et al. (2006) based on financial executives of listed commercial and industrial companies in the UK, the pecking order theory is supported. The financial executives express a preference for funding from internally generated profits, followed by debt, and finally fresh equity issuances. This preference is informed to a significant degree by the transaction costs associated with raising debt and fresh equity, and what new equity issuances would signal to the market. The study also showed how dividend payout ratios and investment opportunities determined the amount of debt funding required.

More recent studies include Flannery and Rangan (2006), Huang and Ritter (2007), and Atiyet (2012). The authors build on the models of Frank and Goyal (2003) and Shyam- Sunder and Myers (1999) covering multiple jurisdictions including the USA and France. The findings are consistent with those of Frank and Goyal (2003), and in addition observe firm's opportunistically issue equity when share prices are over valued. This latter observation supports the findings of Myers and Majluf (1984). In Sub-Saharan Africa Gwatidzo and Ojah (2009) observe a preference for the pecking order theory versus the static trade off theory in analysing the capital structure of listed firms in Ghana, Nigeria, Kenya and Zimbabwe. The conclusiveness of this study is to some degree challenged by later studies wherein Adesola (2009) analyses the capital structure of 27 listed Nigerian firms and concludes that both the pecking order theory and static trade-off theory are equally applicable. In a survey of 33 chief financial officers of listed companies on the Johannesburg Stock Exchange, De Wet

and Gossel (2016) also find both the pecking order theory and static trade-off theory are equally applicable, confirming the Adesola (2009) results.

2.4 Financial contracting factors

In Modigliani and Miller's (1958) proposition capital supply is perfectly elastic due to the existence of efficient capital markets. A number of American studies challenge this assumption arguing that the supply of capital significantly influences capital structure. Faulkender and Petersen (2006) use investment grade credit ratings as a proxy reflecting access to capital markets between 1986 and 2000. The authors find that firms with a credit rating have significantly higher debt ratios than those without. This study suggests firms with a credit rating enjoy a more favourable supply of capital. While the existence of the credit rating may reflect unobservable differences in demand between firms, Faulkender and Petersen (2006) neutralise these effects through applying instrumental variables and employing proxies for firm visibility and uniqueness, as substitutes for having a credit rating. Other studies have supported the significance of capital supply on capital structure including Sufi (2009) where credit ratings on syndicated loans were observed to attract riskier borrowers and increase leverage in 1995. Similarly Tang (2009) observes that firms that received an improved credit rating due to Moody's refinement of their credit rating methodology in 1982, added more long term debt and had higher leverage than firms whose credit rating deteriorated.

Leary (2009) observes how the introduction of negotiable certificates of deposit in the 1960s and interest rate ceilings in 1966 had the effect of reducing capital supply, and had different leverage effects on smaller firms relative to larger firms. In the convertible bond markets, Choi et al. (2010) demonstrate how supply shocks were experienced in the issuance of convertible bonds as a direct result of the short sale ban on convertible bonds during the 2008 international financial crisis. Rice and Strachan (2010) find that decreased bank competition may have the effect of restricting debt supply to firms even though the loan quantities remain relatively unchanged, impacting on the underlying firms leverage. Finally, Lemon and Roberts (2010) observe that both debt issuance and investment in sub-investment grade bonds are affected by the supply of sub-investment grade bonds. However because the sub-investment grade rated firms are unable to substitute debt for equity, leverage levels remain largely unchanged. These studies demonstrate how capital supply may have a different impact on leverage depending on the type of market involved. Another issue observed to potentially influence leverage is financial contracting factors. Financial contracting theory may be useful in

widening our understanding of capital structure beyond the mainstream theories. Specifically, the friction that arises between owners/managers and debt capital providers can generally affect the types of financing contracts such as covenants, maturity terms, leasing arrangements, and the potential for negotiations. Financial contracting theory posits where features in debt contracts mitigate agency conflicts, leverage may play a more limited role in reducing agency and information problems. Nini et al. (2009) argue that covenants may be more effective in addressing agency conflicts than increased leverage. This supports Smith and Warner's (1979) observation that dividend and financing policy restrictions are significant in controlling bondholder/stakeholder conflicts, and therefore strongly influence firm leverage. Rampini and Viswanathan (2010) add to these observations by proposing that the debt capacity of a firm may be influenced not only by collateralizable assets, but also incentive conflicts. This helps to explain the lower leverage exhibited by some firms due to extensive use of off balance sheet financing in the form of leases. Chava and Roberts (2008) also highlight how covenants may be used to limit managerial discretion, also impacting on firm leverage. In a survey of private and public firms spanning the financial crisis period of 2007 – 2009, Campello et al. (2011) find that of the firms that breached covenants, 9% had their credit facilities cancelled, whilst others had unfavourable changes to their terms. The adverse changes included higher fees, collateral requirements, and borrowing limits. In summary, financial contracting factors may demonstrably impact on the leverage of firms in a manner that the mainstream models may not capture.

2.5 Capital structure summary

This above section of the literature reviewed the two main contending theories of capital structure, namely the pecking order theory and the static trade-off theory, and concluded with a consideration of financial contracting factors. The literature review compared the explanatory power of each theory and its applicability in developed and developing markets. The explanatory variables that informed the capital structure considerations in both theories included profitability, asset tangibility, the firm's size, non-debt tax shields, growth opportunities, and earnings volatility. The implications of the two capital structure theories and explanatory variable on leverage are captured in Table 2.1 below:

Table 2.1: Theoretical implications on leverage of the explanatory variables

Variables	Trade-Off Theory	Pecking Order Theory
Profitability	↑ leverage	↓ leverage
Tangibility	↑ leverage	↑ leverage
Size	↑ leverage	↓ leverage
Non-Debt tax shields	↓ leverage	n/a
Growth opportunity	↓ leverage	↑ leverage
Volatility	↓ leverage	↓ leverage

2.6 Agency Theory

The origins of agency theory can be traced back to the 1960s and 1970s wherein economists explored risk sharing among individuals or groups (Arrow, 1971; Wilson, 1968). These studies framed the risk sharing challenge as one where co-operating parties have a different appetite and attitude towards risk. Initially the focus of agency theory was on the relationship between shareholders and owners. Subsequently, the application of this theory has been broadened to other fields in organisational theory and strategic management where co-operating parties have different goals and there is a division of labour (Eisenhardt, 1985; Jensen and Meckling, 1976; Ross,1973). The crux of agency theory is to explore agency relationships where one party (the principal) delegates work to another party (the agent) and the interests of principles and agents diverge. In addition, a broader application of agency theory explores how stakeholders of an organisation seek to ensure that their interests are recognised and satisfied. The theory attempts to describe these relationships, and offer a hypothesis on the motivations of each participant and how they are likely to behave.

Agency theory tries to address two key problems that occur in agency relationships. The first problem arises where the objectives of the principal and agent conflict, and it is costly or difficult for the principal to verify what the agent is actually doing in part due to information asymmetry. The second problem arises due to the principal and the agent having differing appetite for risk (Eisenhardt, 1989). Because the relationship between the principal and the agent is captured in a contractual arrangement, this becomes the unit of analysis in agency theory. The focus of the theory is therefore on the most efficient and effective contracts governing the principal-agent relationship, given assumptions about the people or organisations that are the contracting parties (Eisenhardt, 1989). Despite

the existence of contracts, problems arise in agency relationships due to the difficulty of perfectly contracting for every possible action of an agent whose decisions affect both his own welfare and the welfare of the principal (Brennan, 1995). This results in the problem of how to induce the agent to act in the best interests of the principal. In the shareholder/manager context, agency costs can be seen as the value lost by shareholders due to a divergence of interests with the managers of the firm, summarily stated as monitoring costs, bonding costs, and residual loss (Jensen and Meckling, 1976).

In order to be able to influence the agent's behaviour the principal incurs monitoring costs or expenditures to measure, observe and control and agent's behaviour. This is necessitated by information asymmetry between managers and owners, with managers having more and superior information on the firm. Examples of monitoring costs include audits, due diligence exercises, and mandatory reporting prescriptions. While these costs are initially paid by the principal, Fama and Jensen (1983) argue that they will ultimately be borne by the agent, as their compensation will be adjusted to cover these costs. Bonding costs may also be incurred when structures are set up by management to induce/enable them to act in the principal's interest, or compensate the principal accordingly if they fail to do so. Management is motivated to set up bonding cost structures due to the fact that it ultimately bears the costs of monitoring. Bonding costs may involve both financial and non-financial costs, the latter including additional information and disclosure that management may also utilise in the activities of the firm. Management are likely to cease incurring bonding costs when marginal reduction in monitoring costs equals the marginal increase in bonding costs (Hill and Jones, 1992). Despite monitoring and bonding mechanisms, the interests of managers and owners are still unlikely to be perfectly aligned, resulting in agency losses from conflicts of interest. These losses are called residual losses. Residual losses occur because the costs of fully enforcing principal-agent contracts through monitoring and bonding far outweigh the benefits enjoyed from doing so. This culminates in a level of residual loss that represents a trade-off between overly constraining management and enforcing contractual mechanisms designed to reduce agency problems (Donaldson and Preston, 1995).

Agency costs in the owner/manager relationship can be attributed to four main categories, namely moral hazard, earnings retention conflicts, time horizon conflicts, and managerial risk aversion. Moral hazard agency conflicts occur where managers seek to maximise compensation and

benefits from the firm, but this occurs at the expense of shareholders (Jensen and Meckling, 1976). Moral hazard problems are likely to be more acute in larger companies because the complexity of the nexus of contracts increases exponentially with the size of the firm, making larger firms more difficult to monitor and increasing related costs (Jensen, 1993). Earnings retention conflicts may also occur where managers seek to apply retained earnings to grandiose managerial visions as opposed to distributing dividends to shareholders (Brennan, 1995). The third category of agency costs may occur as a result of time horizon agency conflicts. These occur because shareholders are likely to be attentive to the cash flows of the firm indefinitely into the future. Alternatively, management is likely to have a shorter-term horizon aligned to their term of employment and related compensation. This may also lead to manipulation of the financial results to reflect a picture more favourable to enhancing management compensation (Weisbach, 1998). Finally, managerial risk aversion may result in agency conflicts due to managers being less inclined to take risks, as the firm is their most important source of income. Shareholders on the other hand are able to diversify their holdings, and may have a higher risk appetite. Brennan (1995) submits that risk averse managers will prefer equity financing to reduce the risks of bankruptcy associated with incremental debt.

Agency theory has emerged as an important paradigm in the financial economics literature (Jensen and Meckling 1986; Ross 1973). It is applicable in a number of fields and variety of settings from macro-level issues such as laws and regulatory policies, and micro-level issues such as subcontracting arrangements. Predominantly agency theory has been employed in organisational phenomena including compensation, acquisition and diversification strategies, board relationships, ownership and financing structures, vertical integration and innovation (Eisenhardt, 1989). The section below explores the main branches of agency theory and the academic literature and empirical results. It then introduces a sub-category of agency theory referred to as stakeholder agency theory that is particularly useful as a lens through which to explore contractual arrangements in co-operative schemes.

2.6.1 Positivist and Principal-agent agency theory

Agency theory has from its formation developed into two major lines, namely positivist and principal-agent agency theory (Jensen, 1983). Both lines have the same underlying assumptions and focus on the contract as common unit of analysis between principal and agent. Positivist agency theory is primarily concerned with scenarios where the principal and agent

have conflicting goals, and the mechanisms put in place to curb the agent's self-serving behaviour. A typical approach is to identify a scenario where stockholder and management interests diverge, and address this by way of information systems (monitoring) or outcomes based incentives. It is generally less mathematical and more qualitative than principal-agent agency theory, and the primary area of focus of positivist researchers has been on the owner/manager dynamic in large listed corporations (Berle and Means, 1932). Arguably the three most influential articles by positivists include Jensen and Meckling's (1976) exploration of the ownership structure of the firm, and how the alignment of owners and managers may be better aligned where managers have equity stakes in the firm. Fama (1980) explored how capital and labour markets can be used as a signalling and information system to control self-serving management. Fama and Jensen (1983) examined the role of the board of directors in collating and disseminating information for all shareholders, and in so doing conducting effective monitoring and moderating managerial discretion. The key contribution of the positivist agency approach has been to advance and propose governance principles that address the agency problem (Eisenhardt, 1989).

Principal-agent research is the second and more generalised line of agency theory encompassing all agency relationships such as lawyer and client, auditor and client, buyer and supplier, and other agency relationships (Harris and Raviv, 1978). This more formal theory is characterised by a considered application and expression of underlying assumptions, followed by logical deduction, testability, and mathematical proof. Its focus is on determining the optimal contract, and behaviour versus outcome, between the principal and the agent. Due to its mathematical and abstract nature principal-agent research has been less accessible to organisational theorists and business practitioners. Principal-agent theory has tended to have a broader area of application than positivist agency theory with the latter being largely limited to the owner/manager dynamic.

2.6.2 Empirical results of agency theory

The following section on the empirical results of agency theory will initially deal with the results from positivist agency theory followed by the principal-agent agency theory line. The positivist agency theory academic literature is dominated by studies of large listed firms where ownership and management are distinct, and a significant amount of secondary data is available in the public domain.

Amihud and Lev (1981) explore why firms pursue conglomerate structures and mergers. These actions appear counter intuitive as shareholders can on their own diversify their shareholdings. The investigation corroborated that managers are incentivised to diversify their own personal risks as employees by constructing conglomerate structures. The study supported the hypothesis of Jensen and Meckling (1976) that owner managed firms are more likely to engage in conglomerate mergers than firms with a single significant shareholder. In a study covering 105 large corporations in the USA, Walking and Long (1984) concluded that managers would resist takeover bids that may be beneficial to shareholders, so as to secure jobs and benefits. This study is consistent with Jensen and Meckling (1976) that observed where managers have an equity stake in the business and would participate in equity upside in the event of a takeover, such managers were less likely to resist such corporate action.

Wolfson (1985) observed the effective constraining influence of market discipline on the principal/agent relationship in oil and gas shelter programs. Despite the divergent goals of multiple participants, and the principal's extensive information advantages, the programs were successfully executed because all participants were subject to disciplining market forces. This confirmed Fama's (1980) study that long term reputational issues influenced short-term principal and agent behaviour. Kosnik (1987) studied 110 large US corporations and found that managerial opportunism was more likely to succeed where the proportion of independent board members was lower. This study is consistent with Fama and French's (1983) study of company Boards. Argawal and Mandelker (1987) studied 209 firms that participated in acquisitions and disposals between 1974 and 1982. Their study found that where executives owned equity in the company, they were inclined to lower risk transactions and financing decisions, aligning their interests more effectively with those of shareholders. Singh and Horianto (1989) analysed 84 Fortune 500 companies and also concluded that golden parachutes for executives align them to shareholder interests and act as an effective substitute for equity ownership in a takeover situation. This study is consistent with the agency theory findings of Jensen and Meckling (1976), and Fama and Jensen (1983). Barney (1988) explored whether giving employee share options would better align their interests with those of shareholders, and culminate in a lower cost of capital. The results were positive and in agreement with the agency theory hypothesis of alignment of interests. In summary positivist agency theory supports the proposition that owner and manager interests diverge in takeover attempts, debt versus equity funding, executive management compensation levels, and

acquisitions and disposals. This lack of goal congruence can be substantially ameliorated by way of outcome based contracts such as golden parachutes, market disciplinary forces, executive stock ownership, and through effective monitoring by way of comprehensive information systems including boards and market signals.

The principal-agent literature broadly categorises inducement arrangements into contracts that are either behaviour or outcome based. Principals and agents are then likely to select the most efficient contract. Anderson (1985) probed the transaction costs of outcome based (manufacturer representative) and behaviour based (sales force) sales efforts in a sample of electronics firm. The author's findings were consistent with agency theory in terms of what the most efficient and effective contractual approaches were. Eisenhardt (1985 and 1988) examined the choice between salary and commission compensation for salespeople in retailing. The results supported agency theory in being able to predict the most efficient and effective choice between these two contract forms despite the presence of significant institutional variables. This study was extended and replicated by Conlon and Parks (1988) who found that a principal's access to information systems to monitor the agent was positively correlated to the agent's performance of contractual obligations, and vice versa. Finally, Eccles (1985) conducted interviews of 150 executives to determine the most optimal contractual arrangements for transfer pricing. This culminated in the development of a framework premised on agency theory and fairness principals. In summary the principal-agent agency theory line supports the hypotheses of selecting the most efficient and effective contract form, linking this with comprehensive information systems that enable monitoring, discriminating between tasks that are highly programmable and those that are less so, and determining outcome uncertainty and measurement in predicting participant choices and actions.

2.6.3 Contribution of agency theory

Agency theory has made an important contribution to re-establish the importance of incentives and self interest in organisational thinking (Perrow, 1986). Agency theory also makes an important contribution towards the treatment of information. It assumes information is a commodity that has a cost and can be bought. This highlights the value of information and how it can be used via information systems to control agent opportunism. Agency theory also expands the risk paradigm for organisations by assuming them to have uncertain futures that organisational participants may not be able to fully control. This enables

contextual changes such as government regulations, new competitors, technical innovation, political disruption etc. to be incorporated in a holistic framework. This broader and deeper perspective has the potential to improve organisational thinking, planning, and ultimately, risk management and contracting.

2.6.4 Criticism of agency theory

Williamson (1983) is sceptical of the merits of agency theory arguing that its creators and proponents had not succeeded in demonstrating that there was a reason to be concerned where ownership and management are separated. Donaldson (1990) criticised agency theory on the basis that its methodology disregards other ideological frameworks, organisational economics and corporate governance. This is consistent with other academic contributors including Klein et al. (2008) and Lubatkin et al.(2007). Donaldson (1990) contended that agency theory is narrow minded in its view of individualism, myopically defined motivation, and over simplification, compromising central tenets of its model. Williamson (1985) argued that opportunistic behaviour did not necessarily occur in the majority of individuals, but in the minority. Accordingly, agency theory that is premised on wholesale opportunistic behaviour by actors may be structurally flawed. Hill (1990) implicitly supports this criticism asserting that there are individuals who prioritise trust and co-operation and will not participate in opportunistic behaviour. Podrug (2010) criticises agency theory on the basis that the controls put in place to reduce opportunism can exacerbate individualistic behaviour, erode trustworthiness, and reduce pro-activeness. The limited normative dimensions of agency theory also raise concerns regarding ethical and moral conduct. The dyadic conceptualisation of the principal agent problem has been a key criticism of agency theory because in many cases agents are in fact serving multiple masters (Shapiro, 2005). It has further been proposed that agency theory is an American construct premised on ultra individualistic instincts that may not be appropriate in relationship driven or communal cultures (Johnson and Droege, 2004; Lubatkin et al., 2005).

A final criticism of agency theory is that it is premised on a divergence of attitudes towards risk and information asymmetry. Where these two factors are addressed, agency theory has little to offer and is scientifically limited, because the principal can define and control the agent's behaviour and offer appropriate compensation. In summary agency theory may fail to fully account for alternate stances and important considerations when analysing interactions between the principal and the agent. These include ignoring the principal's responsibilities towards the agent (Donaldson, 2012),

fostering distrust amongst participants, disrespect for the agent, overlooking moral and ethical considerations, and inadequately pursuing solutions that have a sound ethical basis.

2.7 Stakeholder theory

Stakeholder theory is rooted in stakeholder theory that began to develop after the publication of Freeman's 1984 seminal book entitled *'Strategic Management: A Stakeholder Approach'*. Freeman (1984) submitted that organisations that are aware of the stakeholders that impact on their business, and take a pro-active approach to managing these stakeholders and addressing potential conflicts, are more likely to achieve superior performance. Accordingly, strategically managed organisations should be managed in the interests of stakeholders as a whole, and not only based on the narrow interests of managers and owners. This latter proposition is justified by two overarching observations. Firstly, formal organizations and firms having become the dominant institutions of the 20th and 21st centuries, increasing reports of ethical misconduct within them, and the harmful impact of corporate negligence with regard to the natural environment attributable to formal organisations (Laplume et al 2008). Secondly, existing management theories fail to take into account the quantum of change occurring in the business environment. This has shifted from a focus on suppliers, employees, managers, and owners, to include other external stakeholders such as governments, consumer advocates, environmentalists, special interest groups, the media, and even competitors. Stakeholder agency theory provides a prism by which a more holistic, demanding, and inclusive assessment can be made of the factors influencing and intermingling, to determine decision making by an organisation and its various stakeholders.

A significant part of the controversy associated with stakeholder theory is that it challenges the assumption that management should primarily seek to maximise the profits of the firm (Jensen, 2002). Yet it has enthusiastic proponents on account of its attempt to address how organisations affect society (Hinings and Greenwood, 2003). Three branches of stakeholder theory have emerged: the descriptive (how firms behave), the normative (how firms should behave) and the instrumental (how behaviour affects performance) (Donaldson and Preston, 1995). Within these branches are five themes that frame the interaction of stakeholders, how decisions or positions are arrived at, and the impact this has on a firm, and vice versa. These five themes are stakeholder identification and salience (importance), stakeholder actions and responses, firm actions and

responses, firm performance, and theory and debates on the stakeholder philosophy.

Freeman (1984; page 46) defined a stakeholder as “any group or individual who can affect or is affected by the achievement of the organisation’s objectives”. Whilst there is greater emphasis on the “is affected” category the author suggested that firms engage and deal with groups that affect them, and be responsive to groups that the firm can affect. Subsequent contributors to the definition of a stakeholder have offered both narrow and expansive views. Frooman (1999) and Pajunenen (2006) restrict their view of stakeholders to those who wield power over a firm, while Clarkson (1995) and Cragg and Greenbaum (2002) posit that stakeholders are only those who take on some element of risk in the commercial venture. The more expansive definers of stakeholders include Argandona (1988) and Phillips (1997) who incorporate powerless parties that are directly or indirectly connected to the firm’s activities, and even non-human entities such as trees and spiritual deities as proposed by Starik (1985) and Schwartz (2006). Regarding the importance of stakeholders, studies appear to conclude that managers pay attention to stakeholders that have power in relation to the firm, are deemed legitimate, and can muster a sense of urgency (Mitchel, Agle, and Wood, 1997). These observations on stakeholder salience are confirmed in a number of subsequent empirical studies including Eesley and Lennox (2006) and Winn (2001). Others have however argued that stakeholder salience is a function of the organisational culture and the political framework and industry within which the firm operates (Jones, Felps, and Bigley, 2007; Henriques and Sardosky, 1999; Fineman and Clarke, 1996). In summary the identification, categorisation, and prioritisation of stakeholders continues to be a hotly contested aspect of stakeholder theory.

The second theme of stakeholder actions and responses imputes that managers need to go beyond understanding stakeholder interests, and need to be able to anticipate and predict the influence strategies that stakeholders may deploy. These predictions will include resolving questions as to how do stakeholders influence firms, when will stakeholder groups mobilise and when will stakeholders support firms? Frooman (1999) argues that stakeholders use direct strategies to influence a firm when the firm depends on them for resources and indirect strategies when it does not. Stakeholders are likely to withhold resources to the firm where they have full control over these, and attach conditions to the firm’s utilisation of such resources (Sharma and Henriques, 2005). The influence of stakeholders is determined by the power and legitimacy of the

stakeholder (Eesley and Lennox, 2006; Welcomer, 2002), and the level of influence may also be prescribed by contractual forms, relationship structures, and institutional arrangements (Friedman and Miles, 2002). Stakeholder groups are most likely to mobilise when they are aware, willing and capable, when the target organisation is perceived as being responsive to stakeholder advocacy, and where there is a desire to protect interests and to express a group identity (Rowley and Berman, 2000; Butterfield, Reed, and Lemak, 2004; Wolfe and Putler, 2002). Following on form this the academic literature shows that stakeholders are inclined to support firms where there is no significant adverse environmental impact, and where stakeholders believe they have been equitably rewarded, considered and treated (Hendry, 2006; Hosmer and Kiewitz, 2005). Firms are also more likely to enjoy stakeholder support where they are older and more established, legitimate in the eyes of stakeholders, reliable, accountable and strategically flexible (Choi and Shepard, 2005).

The third theme of firm actions and responses seeks to address questions as to how firms gain stakeholder support, how firms should manage stakeholders, and how firms should balance stakeholder interests. Regarding gaining stakeholder support the academic literature proposes a number of interrelated initiatives. These include building stakeholder trust and avoiding opportunistic relationships (Husted, 1998; Jones, 1995) and the deployment of charitable contributions (Adams and Hardwick, 1998; Brammer and Millington, 2004). Reputation management and active impression management through rhetoric and images are another way of gaining stakeholder support (Carter, 2006; Ulmer and Sellnow, 2000) while Marens and Wicks (1999) advocate for the use of employee stock option programs to gain support from the labour force, and Louma and Goldstein (1999) propose board representation. The efficacy of the strategies above remains inconclusive. Regarding the management of stakeholders Freeman (1984) proposed a system whereby the firm sought win-win settlements but engaged in a combination of exploit, defend, swing and reinforce interventions to avoid conceding to all stakeholder demands. Flowing from this observation Rowley (1997) argues that a firm is better positioned to resist stakeholders when it is a central player in its stakeholder networks, and the stakeholders are less densely interconnected. This beneficial network positioning enhances management's ability to deploy specific tactics against stakeholders namely, movement (ignoring legal obstacles in the belief that they would change), multimatum (requesting approval after the point of no return), and manipulation (playing one party off against another) (Huse and Eide, 1996). While these tactics may effectively circumvent stakeholders and be

ethically questionable, they are in certain situations, highly effective. The organisational culture of a firm will also influence how stakeholders are managed. Individualistic firms tend to maintain weak ties with stakeholders while relational firms are inclined to maintain strong trust based ties (Brickson, 2007). With respect to how firms balance stakeholder interests Jensen (2002) argues that the primary objective of the managers is to maximize the long-run value of the firm with explicit view that the shareholder is the primary and most important stakeholder. In stark contrast Schwartz (2006) and Beekun and Badawi (2005) propose that practitioners can look to sacred texts such as the Koran and the Bible that give guidance on the balancing of stakeholder interests. Other contributors have suggested the use of analytical techniques to consistently and scientifically balance the needs of competing stakeholders (Schwarzkopf 2006), whereas Bendheim, Waddock, and Graves (1998) find that best practices differ form one industry to another. Burton and Dunn (1996) argue that stakeholder input should be integrated into management decision making to achieve consensus, or where conflicts arise, should be resolved through a mediation process (Lampe, 2001). In all these considerations managers work under the constraints that stakeholders have different levels of importance, many decisions cannot be perfectly resolved to incorporate all stakeholder interests to their full satisfaction, and interests must be balanced ethically between decisions (Reynolds, Schultz, and Hekman, 2006).

The fourth theme of firm performance seeks to establish how stakeholder management impacts on the operational and financial performance, corporate social performance, other organisational outcomes affected by stakeholder management. Out of 12 empirical studies that directly tested instrumental stakeholder theory between 1984 and 2007, Laplume et al (2008) found 9 of these studies to show a positive relationship, 1 is negative, and 2 reflect mixed results regarding between stakeholder management and firm performance. The most prevalent approach of stakeholder operationalization was a multi-faceted index incorporating community relations, workplace diversity, labour relations, environmental impact, and product safety (Berman et al, 1999; Hillman and Keim, 2001; Waddock and Graves, 1977). This approach has been criticised because it places equal weighting on each of the indicators and implicitly pre-supposes that there are no trade-offs between stakeholder interests (Barnett, 2007). Margolis and Walsh (2003) review 127 empirical studies on the relationship between firm financial performance and social initiatives concluding that there is a positive association between the two and very limited evidence of a negative association. The positive

association between stakeholder management and financial performance may be moderated by environmental and contextual factors that may differ widely from one country and industry to another (Greenley and Foxall, 1997). Regarding how stakeholder management impacts on corporate social performance a number of academic papers argue that stakeholder action provides the fabric and logic by which social and financial performance objectives can be negotiated and aligned (Barnett, 2007; Caroll, 1999; Waddock and Graves, 1997). Active stakeholder participation is also important in moderating the financial objectives of the firm relative to other ethical considerations (Berrone et al., 2007). Regarding environmental performance, Kassinis and Vafeas (2002) argue that stakeholder pressures are a weak and ineffective deterrent to firms. Concerning what other organisational outcomes are impacted by stakeholder management Heugens et al. (2002) posit that stakeholder management enhances societal legitimacy and organisational learning. Harting et al. (2006) observe how innovation is nurtured die to stakeholder input while Schneper and Guillen (2004) associate effective stakeholder engagement with a probability of hostile takeover bids. Finally, Coombs and Gilley (2005) argue that stakeholder management reduces CEO salaries and helps in curbing excessive compensation schemes.

Stakeholder theory has been justified in the academic literature through three approaches to the theory that have become widely accepted. The descriptive approach seeks to explain and show how the concepts and ideas articulated in stakeholder theory are observed in reality. The instrumental approach attempts to demonstrate a linkage between stakeholder management and corporate performance. And the normative approach appeals to issues of social justice including respect for group rights, social contracts, and environmental considerations. These approaches of stakeholder theory appear to be complementary and interrelated as the descriptive approach explains relationships observed in the world, and is supported by instrumental predictive value approach. If certain practices are carried out then particular results or outcomes are likely to occur which is the normative conception that addresses moral and ethical values (Donaldson and Preston, 1995).

2.7.1 Criticism of stakeholder theory

Stakeholder theory has been robustly criticised on three major fronts. These are the normative foundations upon which the theory is based, problems and challenges of the stakeholder theory itself, and stakeholder theory's competition with other theories, some of which are more established. Regarding the normative foundations of stakeholder theory, it

has been applied using a number of varying and potentially conflicting normative frameworks including property rights (Donaldson and Preston, 1995), feminist ethics (Lampe, 2001), the “common good” (Gibson, 2000), Aristotelian ethics (Wijnberg, 2000), Kanian ethics (Lea, 2004), and Islam (Beekun and Badawi, 2005). This diversity and plurality in normative foundations dilutes the robustness and universal applicability of stakeholder theory.

Stakeholder theory has also been criticised on the grounds that exacerbates agency problems by increasing the number of parties informing how decisions are made, and the plurality of interests that arise (Jensen, 2002). Sundaram and Inkpen (2004) argue that stakeholder theory is under theorised and under researched, while Kline (2006) argues that the remit of stakeholder theory may be too broad to allow rigour in practitioner application and academic theorising. Stakeholder theory’s non-recognition of incentives is a major criticism of Elms, Berman, and Wicks (2002) and Kaler (2006) criticises the theory on the basis that it extremely difficult to implement. The applicability of stakeholder theory to small or medium sized enterprises is challenged by Perrini (2006), whilst Balmer, Fukukawa, and Gray (2007) submit that stakeholder theory is based on false assumptions.

The final criticism of stakeholder theory relates to how it competes with other theories. Notably stakeholder theory competes directly with stockholder theory as detailed by Wagner-Tsukumato (2006). The agency theory of (1992) also appears to be in direct competition with stakeholder theory together with integrated social contract theory, corporate social performance, corporate citizenship and institutional theory (Bishop, 2000; Rowley and Berman, 2000; Scherer, Palzzo, and Baumann, 2006; Luoma and Goodstein, 1999). These other theories are sometimes better researched, have been more exhaustively empirically tested, and are seemingly more robust and focused in their propositions.

2.7.2 Stakeholder agency theory

Stakeholder agency theory takes agency theory and stakeholder theory as points of departure and proposes a new paradigm that is a generalised theory of agency and stakeholder interactions. Specifically, stakeholder agency theory explores the nature of explicit and implicit contracts that exist between managers, owners, and other stakeholders in relation to the organisation. Regarding these interactions, stakeholder agency theory posits that other stakeholders beyond managers and owners place claims on the firm that reduce resources available for reinvestment and

distribution to shareholders. These claims may include employee demands for higher wages, customer demands for better quality and lower prices, supplier demands for more certain order patterns, claims of local communities, and environmental preservation demands by the broader public. While these divergent interests may in certain instances converge, there will also be areas of divergence that will necessitate management to make decisions as to how resources are allocated, and some stakeholders suffering utility loss as a result. Stakeholder agency theory submits that this paradigm results in predictions on stakeholder interactions that are not always consistent with agency theory, and has better explanatory power (Hill and Jones, 1992).

In contrast with agency theory that assumes markets are efficient and adjust rapidly to equilibrium, stakeholder agency theory is more pessimistic and recognises that markets may be characterised by inefficiencies in the short to medium term (Perrow, 1986; Putterman, 1984). By way of example, agency theory views principals and agents as having the freedom to enter into and exit from contractual relationships fluidly and seamlessly. However if the markets surrounding the organisation are inefficient, this will result in the introduction of power differentials in the stakeholder agent equation as contracts are not seamlessly commenced or terminated. The recognition of these market inefficiencies and frictions, and how they influence principal-agent relationships, and governance mechanisms policing contracts increase the explanatory and predictive power of stakeholder agency theory relative to agency theory alone. Porter (1980) argues that friction in markets may occur as a result of barriers to entry or exit, or purposeful management interventions such as actions to keep out new entrants, collusion, and predatory pricing. Disequilibrium in markets may also persist when as a result of organisational inertia, incentive, monitoring, and enforcement structures fail to respond quickly to new circumstances such as changes in the political environment, macro-economic trajectory, demographic changes etc. These contextual factors are likely to be in continual flux, which may mean that there is an almost permanent disequilibrium in the power differentials between stakeholders (Williamson, 1985).

Within the stakeholder agency theory paradigm management has a unique and powerful role as all contracts whether explicit or implicit must be entered into through the management nexus. Furthermore, management is the only stakeholder with direct control over the decision- making apparatus of the firm, while other stakeholders are limited to indirect control or no control on decision making at all. This situation puts

management at the centre of making strategic decisions on resource allocation. Stakeholder agency theory proposes that the essential role of management then is to address the claims of stakeholders in a manner that best reconciles divergent interests (Hill and Jones, 1992). Stakeholder agency theory proposes that stakeholders will act in a manner that maximises the utility that accrues to them. A simplistic example of this is where an organisation generates 100 units of utility and management decisions result in stakeholders receiving 60 units of the utility generated. Stakeholders are likely to put in place incentive, monitoring, and enforcement mechanisms that result in them enjoying 90 units of utility. 10 units of utility will be foregone in the process as a residual cost of the incentive, monitoring and enforcement mechanisms put in place. This contestation between stakeholders necessitates the implementation of interest alignment mechanisms and monitoring and enforcement mechanisms to manage the divergent interests, and enable the commencement or continuance of the venture. These interventions are elaborated upon below.

2.8 Interest alignment mechanisms

The underlying goal of interest alignment mechanisms is to form shared dependency amongst managers and other stakeholders so that interests are more closely aligned. Demsetz (1983) observes the widespread use of stock options to align shareholder and manager interests. In other areas such as environmental considerations, the public claim as a stakeholder may be enshrined through legislation that compels an organisation to operate in a prescribed manner, or by way of incentives such as tax deductions on environmental and socially responsible expenditure. Hill and Jones (1992) also extol bonding costs such as warranties on durable products that must be fulfilled by manufacturers in the event of a malfunction within prescribed period. Alchain and Woodward (1988) make reference to a bonding mechanism that requires suppliers to post a bond forfeitable upon malperformance. It is anticipated that commitments to bond shareholders and stakeholders will be higher for investments in specialised assets with much lower secondary or residual values (Williamson, 1985).

2.8.1 Monitoring and enforcement mechanisms and structures

The existence of divergent interests between stakeholders necessitates the establishment of monitoring and enforcement mechanisms and

structures. The fundamental premise underlying stakeholder interactions is stakeholders will furnish the organisation with certain resources, and be compensated accordingly by way of a recognition of their claims to the firm. To ensure that parties adhere to the explicit and implicit agreements a number of institutional structures, referred to in agency theory as governance structures, have evolved that serve the function of monitoring and enforcing the terms of these contracts (Mitroff, 1983). These governance structures go beyond the traditional functions performed by the board of directors, national legal and regulatory frameworks, and other third party governance mechanisms, as they are purposefully and specifically designed to limit utility loss potential by stakeholders on a project specific basis.

Hill and Jones (1992) highlight that information asymmetry between managers and stakeholders puts managers at a significant advantage, and makes it difficult for other stakeholders to determine whether managers are acting in their best interests. In response to this inequitable situation, other stakeholders justifiably seek to obtain more information on management activities. Where stakeholders attempt to obtain more information individually costs can become high and unaffordable and these impediments are exacerbated where the stakeholder base is large and diffuse. In order to overcome these costs and obtain information on managers more efficiently, a wide range institutional structures have evolved including mandatory publishing of annual results, analyst reports, and monitoring bodies such as environmental non-profit organisations. The over arching objective of these institutional structures is to more efficiently gain information on management decisions and actions, so as to monitor management more effectively, and minimise utility losses for stakeholders.

The goal of enforcement mechanisms is to act as a deterrent to actions by a stakeholder that if left unchallenged would result in utility losses to other stakeholders. Where deterrence is a significant aspect of the enforcement mechanism, Schelling (1960) argues that the warning attributes must be credible, otherwise management will simply ignore them. This may result in a situation where the costs incurred to enforce compliance exceed the utility loss of the stakeholders. In summary, enforcement mechanisms that are not effective deterrents are likely to fail. Deterrent mechanisms can be broadly classified into three categories, namely, the law as a deterrent, exit as a deterrent, and voice as a deterrent.

Laws may be an effective legal deterrent where they are perceived to be a credible threat by managers and stakeholders. Managers will perceive laws as credible where they are observed and supported by a broad range

of stakeholders and effectively communicated to management. This is exemplified in laws relating to environmental protection, anti-competitive and monopolistic behaviour, insider trading etc. These credible threats and law enforcement mechanisms can frequently effectively and efficiently curtail utility losses to stakeholders. In contrast, laws that are commonly ignored by the general population will tend to be ineffective deterrents (Hill and Jones, 1992).

Exit as a deterrent is deployed where a stakeholder credibly threatens to withhold a certain resource from management unless its interests are addressed. An example of this may be a regulatory authority suspending a mining right to a platinum deposit, unless prescribed socio-economic initiatives are implemented. The stakeholder is in effect threatening to exit from the relationship (Hirschman, 1970). The exit of a key stakeholder may be a more effective than a legal deterrent because frequently a legal penalty will not jeopardise the continuance of the firm and managers may simply see it as a cost of doing business. In contrast the withholding of a key resource by a stakeholder can threaten the very existence of a firm (Pfeffer and Salancik, 1978). Exits are more likely to be effective when stakeholders act in unison e.g. all employees withdrawing labour services via a union, as opposed to one employee individually going on strike. This co-ordination challenge becomes more acute when stakeholders are diffuse. To address this, stakeholders have set up institutions including trade unions, consumer union, community groups, environmental groups, and other special interest groups. The exit deterrent may be diluted where stakeholders are locked into an exchange relationship by specific asset investments. In such a situation stakeholders will only exit if they are prepared to incur significant exit costs that occur because the rents on the specialised assets will be significantly reduced in the secondary market. Such barriers to exit reduce the exit deterrent factor as an enforcement mechanism (Hirschman, 1970).

The third and final category of deterrent as an enforcement mechanism is that of voice. The voice mechanism is frequently the cheapest enforcement mechanism, but has great potential to damage managerial reputations. Voice is most effective when articulated by interest groups with a valid claim to represent stakeholder interests including trade unions, community group representatives, etc. In their static equilibrium model, Hill and Jones (1992) submit that stakeholders are likely to increase the complexity of institutional structures, up to the point where the utility cost of maintaining the institutional and enforcement mechanisms is equivalent to the benefit that accrues to stakeholders. Where the utility costs of

maintaining the institutional and enforcement mechanisms exceeds the benefit to stakeholders, it is likely to be irrational and utility destroying for stakeholders to incur such costs, and therefore curtailed.

In summary, stakeholders establish institutions to economise on the costs of obtaining information on management, enable co-ordination amongst different interest groups, and aggregate stakeholder influence where stakeholders are diffuse. By blending the economic rationale of efficiently collecting information on managers, and the power dynamic between stakeholders, stakeholder agency theory promises a framework that is more grounded in reality and an increased predictive power relative to other theories of the firm. In addressing and focusing on the areas of manager and stakeholder conflict, stakeholder agency theory potentially offers lessons as to how to rectify conflict and disequilibrium in stakeholder relations when they inevitably occur.

2.8.2 Performance based contracting

The trend towards performance based contracting (PBC) spans a number of decades and is evident in the private and public sectors over multiple industries ranging from construction, engineering, transport, healthcare and social welfare services, public administration, and information technology (Hypko, Tilebein, and Gleich 2008; Hooper 2008). The key objective in PBC is to tie a portion of the supplier payment to performance. The focus of these contracts is on the specification and evaluation of outputs, as opposed to the required inputs, activities or processes (Martin, 2007). PBC is an integral aspect of project and infrastructure finance for two reasons. Firstly, PBC can be an important enabler in efficient and effective commissioning, procurement and supply chain co-ordination and collaboration, by aligning incentives among participants and contractors. PBC is important where these ventures are required to perform at specific levels and/or meet specified requirements to end users in the form of servitised business models (Ng, Ding and Yip, 2013). Secondly, PBC can provide a basis of integrating societal and environmental outcomes into project outcomes (Dinerstein et al 2013; Henscher and Stanely 2010). This is important in light of the increasing prominence of sustainability considerations, and in light of the fact that many project and infrastructure projects have the potential to have a significant societal and environmental impact. PBC enables attention to be focused on defining performance criteria and facilitates control, monitoring and rewarding of superior performance.

PBC differs markedly from traditional contracting that may be based on supplier costs such as fixed fee and cost-plus contracts or paying per unit of product/service consumed by the customer (Bonnemeier, Burianek, and Reichwald, 2010). It specifies customer value in terms of contractual outcomes, aligning goals and incentives across the supply chain (Datta and Roy, 2011). In addition, it entails a level of risk transfer to the supplier, with rewards as performance translates into financial bonuses or penalties (Randall et al. 2011). Finally, PBC stresses co-production or collaboration between the supplier and customer (Guo and Ng, 2011).

The design and administration of performance based contracts in the procurement of goods and services, is primarily a governance, control, and accountability issue (Ring and van de Ven, 1992). The theoretical frameworks of agency theory and transaction cost economics detailed in the earlier parts of this literature review are therefore useful in informing how PBC manifests in project and infrastructure finance contractual arrangements. Selviaridis and Wynstra (2015) develop a conceptual model on PBC informed by three essential nodes of performance, incentives and risk. The performance node specifies outputs/outcomes and the design of related performance indicators. These performance indicators are monitored to evaluate supplier performance, determine and effect supplier payment, and implement and corrective action where required. The second node of incentives considers the structure of financial and non-financial incentives, and how these impact on supplier behaviour. These incentives focus on the payment structure, rewards and penalties, their application, and intensity. These incentives can encourage the supplier to improve performance or result in adverse unintended consequences and supplier opportunism. Agency theory and transaction cost economics seek to alleviate incentive conflicts in the design and management of PBC. The third node relates to the transfer of risk, with PBC purposefully transferring risk to the supplier who may be risk averse especially where they are of the view that they are unable to control the risk. Selviaridis and Wynstra (2015) contend that these three nodes in Figure 2-1 interact and are interrelated in contract design and management. The academic literature on PBC is extensive and well developed. MacAfee and McMillan (1986) model the process of bidding for government contracts via sealed bids and a competitive tender process. They incorporate the presence of moral hazard and risk averse contractors.

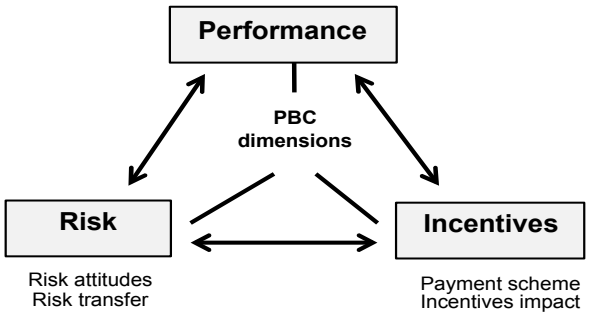


Figure 2-1: A Stylised Model of Performance Based Contracting (Selviadris and Wynstra, 2015)

The authors conclude that the bidding process has the effect of inducing potential contractors to reveal information including that related to expected costs. In arriving at an optimal incentive or performance based contracts, the authors argue there is a trade-off in giving the chosen agent an incentive to limit costs which stimulates bidding competition, and sharing risk. They conclude that the optimal contract is never cost plus, may be fixed-price, but is usually a performance based contract. Consistent with the authors above, Baker (1992) considers and models a scenario where the incentive contract entered to with the agent is not aligned to the principal's objective. Baker (1992) concludes that even where risk transfer is discounted, such an arrangement is likely to result in a dilution of the contract's incentivisation efficacy.

Holmstram and Milgram (1991) submit that standard principal agent models are overly simplistic. In the business world performance objectives may be multiple and disparate e.g. quantity and quality, making rewards and penalties in performance contracts difficult. The authors model a scenario where the principal has different tasks for agents to perform, or a single task with multiple dimensions. The study concludes that in the event that the principal prioritises one task or dimension, this is likely to result in a scenario where non-prioritised tasks or dimensions are neglected by the agent, to the detriment of both the venture and the principal. This challenge may in certain circumstances be addressed by fixed fees/wages. The thrust of their submission however is that incentive problems and related PBC must be done holistically for optimal outcomes. Myerson (1982) proposes the application of game design to consider how a principal should structure a situation that he controls to extract maximum value. The principal addresses the challenge of information asymmetry with agents by prescribing they report specified information to the principal (revelation principle). The principal then recommends decisions to agents

thus enabling incentive-compatible direct co-ordination mechanisms by the principal. This model supports continual in depth participation in aspects of a project that are being executed by third party contractors.

The nature of PBC and how it is deployed in the private versus the public sector is explored by Dixit (1997). The author observes how public organisations differ from private enterprises because their outputs are frequently difficult to quantify and measure, and the goods and services have few close substitutes making incentives using traditional market forces difficult. The biggest distinction however is that public organisations are answerable to multiple and different constituencies with different objectives i.e. they are agents with multiple principals. These may include the executive, legislative, and judicial branches of government, together with the media, lobby groups and civil society organisations etc. As a result of the many stakeholders in public organisations, they invariably operate in a framework of politics, weakening the incentive system. This decreased impact of incentives in public sector organisations from which this analysis originates is based work performed on large organisations in the private sector. Large private sector firms perform several tasks with output observable to different degrees of accuracy. Focusing on one or a limited number of outputs draws managerial attention to these frequently to the detriment of other outputs. This has the unintended consequence of compromising the neglected/unmonitored outputs (Dixit, 1996). Dixit (1996;1997) is consistent with Holmstram and Milgram (1991) in observing how the effect of PBC can be diluted where there are multiple outputs and a balanced measurement of all of the outputs is difficult. These observations are also consistent with Holmstrom and Paul Milgrom (1989) and Tirole (1994) who submit that because larger firms have more tasks, they suffer from weaker performance based incentives, and as a result outputs that are difficult to measure such as innovation are compromised.

Building on the starkly different contextual environment in the public sector versus the private sector, Dixit (1996) reasons that political processes (public sector institutions) suffer higher transaction costs than private sector institutions. This is largely attributable to the fact that they are multiple principals. As a result, at face value contracts relating to public sector institutions may appear to be sub-optimally structured and have less efficient/effective performance based arrangements. The author submits that a great deal of caution should be applied before labelling public sector contracts sub-optimal, because the contracts may represent an optimal contract after taking into account all the principals involved, even where an aspect of the contract appearing grossly sub-optimal. These observations

are consistent with Williamson's (1999) enquiry into transaction cost politics and economics in foreign affairs. The author concludes that public sector and political institutions are different and perform difficult transactions that may seem inefficient at face value but are the best feasible governance response. Building on academic literature on contracting in the public sector, Vishny et al. (1997) consider under what conditions government should render services in house or contract these to external service providers. Using prisons as an example the authors observe that PBC incentivises service providers to provide a better quality of service and cost reductions and related savings, relative to employees. However, the private service provider incentive to reduce costs in areas that are non-contractible results in service quality and outcomes being compromised, examples being the quality of personnel and the use of force in prisons. On balance the authors conclude that in house provision of prison services is preferable, but private sector provision may be ore optimal where there is contract competition, quality innovations are important, and when unions and patronage system severely paralyse or undermine government institutions. In house services are also preferable for conducting foreign affairs, and maintenance of the police and armed forces. The case for privatisation is however stronger in refuse collection, weapons production, and schools. A notable observation related to how some sectors such as healthcare were extremely complicated to arrive at a determination. Using the state of Oregon as an example Douthwaite (1996) proposes that in addition to the other PBC mechanisms, states should be able to procure construction projects by negotiation. Negotiation has specific advantages including faster project completion, lower costs in procurement and overall project, more discretion in contractor selection and partnering. These advantages are countered by disadvantages including the potential for public perceptions of favouritism, barriers to emerging contractors, less control by the owner, the potential that negotiation may not result in a lower project cost, and risk shifting to the contractor may not occur to the desired effect. Douthwaite (1996) proposes that negotiating construction contracts should be permissible and viewed as another important option in PBC. To address the disadvantages above, public sector entities engaging in the form of contract should be required to address areas of concern to demonstrate that taxpayers' interests are protected.

The auction process is another channel enabling competitive bidding and PBC. Milgrom and Weber (1982) look at the impact on auction prices based on four main auction types namely, English auction, Dutch auction, First Price sealed auction, and Second price sealed auction. The authors

conclude that the English auction generates higher prices for the seller than the Second auction and that the outcomes using either of these two methods are generally equivalent. The Second Price auction is also derived to be superior to the Dutch auction if bidders are risk neutral. Despite these findings the writers are cautious about prescribing programmatic solutions due to the complexity of auction environments. This complexity arises in part due to information asymmetry, the potential for collusive behaviour when bidders are limited and know each other through trade associations, and where multiple opportunities are being auctioned at the same time, resulting in bidders' fear of winning too many or too few concessions.

Laffont and Tirole (1987) investigate the bridge between auction theory and incentive theory. Their paper considers the auctioning of an indivisible project among several firms. The authors submit that the principal (commissioning firm) induces the bidding companies (agents) to disclose their future expected costs in the bidding stage. The principal then uses this information to reduce costs by selecting the most competitive bidder, and negotiating key aspects of the final contract. The winning bidder may be accommodated on increasing costs based on the second lowest bid, and the winners share of cost overruns are likely to decrease with the its announced expected cost. Goel (1995) argues that auctioning of incentive contracts is superior to one-shot bidding by enabling risks to be shared and ensuring the most efficient bidder is chosen. This can culminate in significant cost savings for the principal. Furthermore, by applying a sharing rate where the principal bears a fraction of the costs, the principal may be able to incentivise the agent to curtail costs and derive benefits from this. This form of risk sharing the authors conclude, is suitable for projects such as highway construction, defence procurement, and environmental clean ups. Finally Fehr et al. (2007) examine issues relating to fairness and contracting. They observe that issues relating to fairness have the potential to have a decisive impact on the optimal choice of contract. In this respect bonus contracts that have voluntary but unenforceable bonuses for satisfactory performance, provide powerful incentives and are superior to explicit incentive contracts, where players that are fair minded are involved. However, trust contracts that make significant upfront payments are less efficient incentive contracts.

In summary, PBC is an essential part in aligning the interests of the principal and agents (contractors) in a wide variety of disciplines including in project and infrastructure finance. The precise design and management of optimal incentives is likely to differ based on the underlying project, and

dynamics between the principal and potential bidders/contractors including information asymmetry, the expected duration of the arrangement, risk appetite, the sector, and related governance and control issues.

2.9 Project Finance and Public Private Partnerships

2.9.1 Project Finance

There are multiple definitions of project finance in the academic literature and as outlined in practitioner characterisations on the subject. Esty (2004) defines it as the creation of a legally independent project company financed with equity from one or more sponsoring firms and non-recourse debt for the purpose of investing in a capital asset. The non-recourse or limited recourse nature of the debt arrangements prescribe that debt providers are limited in their ability to extract compensation from the sponsors in the event of a default.

A more stringent definition proposed by Weber and Alfen (2010) asserts that project finance is defined as the financing of a standalone, clearly demarcated economic unit. The key characteristics of a project financing are as follows:

- Special Purpose Company – a special purpose vehicle (SPV) is created to house a new commercial entity. Transactions and related legal obligations are conducted through this stand-alone vehicle;
- Cash flow based lending – the providers of capital, especially debt, extend facilities based on the cash flows that will be generated from the underlying assets in the SPV;
- Risk sharing structures – mechanisms and contractual arrangements are devised to disseminate and allocate risks to those parties that can best manage them;
- Limitation of liability - Lenders have no or limited recourse to recoup their capital from other parties in the event that the project is a commercial failure; (and)
- Off balance sheet financing – equity sponsors are only required to consolidate the SPV into their group financial statements only to the extent that they have a controlling interest.

Project finance is apt to be utilised in large-scale capital-intensive projects that require significant amounts of capital in the form of debt and equity to execute the transaction. These include industries such as mining, telecommunications, oil and gas, power generation and transmission, building and construction, and industrial manufacturing. Projects tend to be highly leveraged with debt to equity ratios ranging from 70% to 80%. The duration of projects tend to extend over periods exceeding 10 years. The SPV in which the project is situated has a finite life and has the sole purpose of executing the project. The SPV also facilitates non-recourse financing by the sponsors and the lenders. The dividend policy and the application of cash flows and profit generated are usually prescribed in advance and tightly controlled and regulated. The number of stakeholders and participants in a project finance transaction can be very large. This is on account of the use of multiple contractors and service providers, and also due to the fact that the project finance structure seeks to distribute risks to multiple parties. Finally, the process of executing a project finance transaction tends to be more costly than generic corporate or asset based finance transactions due to the extensive legal and contractual arrangements and risk mitigation measures (Comer 1996).

Appendix A-1.1 illustrates the stakeholders that typically are party to a project finance transaction and the different roles that are played. A composite of the major participants in a typical project finance transaction is detailed below:

Host government: the host government provides the enabling regulatory environment for a successful project. In this respect the host state will be responsible for issuing operating concessions and environmental licenses, tax directives, regulatory frameworks, and supply/purchase/debt guarantees.

Project sponsors: sponsors inject the equity capital to initiate the project and are de facto owners. Sponsors will typically be made up of host governments, multi-national and local companies, contractors, operators, and suppliers.

Project company: this is the SPV whose sole objective is to undertake the project. The project company will have its own board of directors and executive management team so as to operate as a standalone entity. The SPV's only source of income and cash flows is the revenue generated from the operations of the underlying project.

Project constructor: the project constructor is commissioned to build the physical infrastructure and fulfil pre-determined technical specifications contained in the contract with the project company. The constructor will typically bear the risk of not meeting agreed upon specifications by way of monetary compensation, rectification of the breach, or a combination of the two.

Project operator: on completion of the project an operator will manage and run the project on behalf of the project company. This responsibility includes ensuring the operational efficiency of the project, undertaking required repairs and maintenance, and other daily functions.

Product purchaser: this is often referred to as an off take agreement. The product purchaser issues a commitment to buy specified quantities of the plant's output over stated periods. This gives assurance to the project company that there is a market for its product thus reducing uncertainty.

Critical input supplier: the critical input supplier provides critical input into the project company. This may in the form of a tangible commodity e.g. coal, or merely be a form of licensing such as a mining concession or right-of-way for constructing a highway.

Raw material: often referred to as feedstock the raw material supplier is legally contracted to deliver input of laid out specifications in order to facilitate the continued operations of the plant.

Lending banks: the lending banks provide the primary debt capital. In project finance the arrangements may be syndicated across a number of banks and development finance institutions due to the size of the transactions (Comer 1996) and (Weber and Alfen, 2010).

Table 2.2 below summarises the key differentiation between corporate and project finance arrangements. Williamson (1998) submits that debt and equity are a capital commodity in project finance, and their most important differentiation is that they represent two alternative governance structures. The dominance of debt funding implies a more prescriptive governance arrangement, while significant the dominance of equity funding allows for greater management discretion.

Table 2.2: Corporate Finance – Project Finance Continuum (Comer, 1996)

Dimension	Corporate Finance	Project Finance
Financing vehicle	Multi-purpose organization	Single-purpose entity
Type of capital	Permanent - an indefinite horizon for equity	Finite - time horizon matches life of project
Dividend policy and investment decisions	Corporate management makes decisions autonomous from investors and creditors	Fixed dividend policy - immediate payout; no reinvestment allowed
Capital investment decisions	Opaque to creditors	Highly transparent creditors
Financial structures	Easily duplicated; common forms	Highly-tailored structures which cannot generally be re-used
Transaction costs for financing	Low costs due to competition from providers, routinized mechanisms and short turnaround time	Relatively higher costs due to documentation and longer gestation period
Size of financings	Flexible	Might require critical mass to cover high transaction costs
Basis for credit evaluation	Overall financial health of corporate entity; focus on balance sheet and cash flow	Technical and economic feasibility; focus on project's assets, cash flow and contractual arrangements
Cost of capital	Relatively lower	Relatively higher
Investor/lender base	Typically broader participation; deep secondary markets	Typically smaller group; limited secondary market

Shah and Thakor (1987) argue that the method of incorporation affects both the level of leverage and economic value of a commercial venture. Project finance in effect enables higher debt, higher interest rates, and has the potential to result in higher project valuations than conventional financing. This observation is a key consideration in companies opting for this funding method. This argument is consistent with the findings that where debt is optimally allocated between a sponsor and a new project SPV, the value of the venture may increase as a result of a reduction in agency costs and an increase in the tax shield (John and John, 1991).

2.9.1.1 Advantages of project finance

A key advantage of project finance is that its non-recourse character protects sponsors from claims beyond their original equity investment. In practice this may not necessarily be the case as they may be limited-recourse to the sponsors. To varying degrees project finance may facilitate off balance sheet financing. The scope for off balance sheet financing differs due to different jurisdictions having different accounting standards.

The high leverage associated with project finance is attractive to sponsors who have a preference for funding ventures with debt as opposed to equity, due to limited equity capital. The SPV used in project finance also allows firms to circumvent restrictive covenants such as debt coverage and interest coverage ratios (Chen et al. 1989). Because projects are standalone and ring fenced, adverse political developments in a project or country are less likely to have a contaminating effect on other projects and operations that an entity may be undertaking. Extensive due diligence and financial modelling increases the probability of conceptualising robust projects, and is supported by comprehensive risk management mechanisms. These risk management features enable risk dispersion, and for risks to be allocated to the party that is best able to manage it (Hoffman, 2007). Kleimeier and Megginson (2001) observe that project finance loans have a greater propensity to have fixed as opposed to floating interest rates and as result may enjoy more stable interest cash outflows.

Finally, project finance offers the opportunity for credit enhancement interventions that could decrease the interest levied by lenders. Credit enhancement can take many forms including guarantees, off take agreements, dedicated input feedstock contracts, insurance, and a number of other measures that reduce the risk profile of the project and enhance its attractiveness to lenders. The prescriptive and rigorous contractual and operational parameters enshrined in project finance instil a greater degree of discipline by limiting managerial discretion.

2.9.1.2 Disadvantages of project finance

The disadvantages of project finance revolve around the cost of execution, the complexity of this method, the amount of time required to conclude transactions, and some of the negative social and environmental occurrences that have come to be associated with the project finance framework. The identification and allocation of risk amongst multiple contractors and subcontractors results in a great deal of complexity in project finance arrangements. Project finance transaction costs are high and in the region of 5 to 10 per cent of the transaction value (Esty 2004). The higher costs can be also be attributed to the extensive due diligence performed by costly independent professionals such as engineers, lawyers, accountants, and related specialists that lenders demand. The complexity of project finance frequently results in extended periods of time between deal conceptualisation and financial closure. Lenders demand higher fees and interest on account of the increased risk they assume.

Critics of the highly leveraged nature of project finance argue that this method encourages potentially unacceptable risk taking.

Due to the highly leveraged nature of these transactions, lenders are more active/interfering and involved to secure their interests. This typically manifests by way of restrictive clauses in the loan agreements requiring lender approval for specified operational and contractual changes deemed of consequence by the lender. Lenders also insist on regular site visits, detailed lender reporting requirements including on-going communication on the projects construction progress, operational, technical, financial, and related performance. There may also be reporting prescriptions for force majeure events, contract default notices, and contract revisions undertaken. The final criticism of project finance relates to its socio-economic and environmental record. Many mining, pipeline, electric power plants, and related infrastructure enterprises in both developed and developing countries are being funded by way of project finance. Especially in the developing world, a number of these projects have been observed as engaging in predatory activities including contaminating the environment and taking advantage of indigenous populations, whilst falling short of the economic and commercial benefits they have promised (Baker, 2011).

2.9.2 African vs. World comparison of project finance

The successful deployment of project finance in Sub-Saharan Africa and the rest of the world covering the period 2003 and 2013 displays a number of key features. Firstly, the number of project finance transactions occurring on the continent are limited. In 2013, 35 projects were concluded in Sub-Saharan Africa compared to an international total of 584 projects. Concomitantly the value of deals funded by way of project finance is also insignificant. In the ten-year period up to 2013 approximately 153 project finance deals were closed mobilising debt equivalent to US$ 59 billion (Dornel 2014). Figure 2-2 demonstrates how there has been steady and accelerating growth in the number and value of project finance transactions on the continent. The variation in the value of funds committed to project finance is attributable to the significant differences in deal sizes that results in a weaker correlation between the number of the transactions and the project values. Between 2003 and 2013 the international project finance market grew from US$ 70 billion peaking at US$ 251 billion in 2008. Despite a marked decline to US$ 139 billion in 2009, in part attributable to the international financial crisis and the contraction in credit markets, international project finance transactions raised US$ 204 billion in 2013.

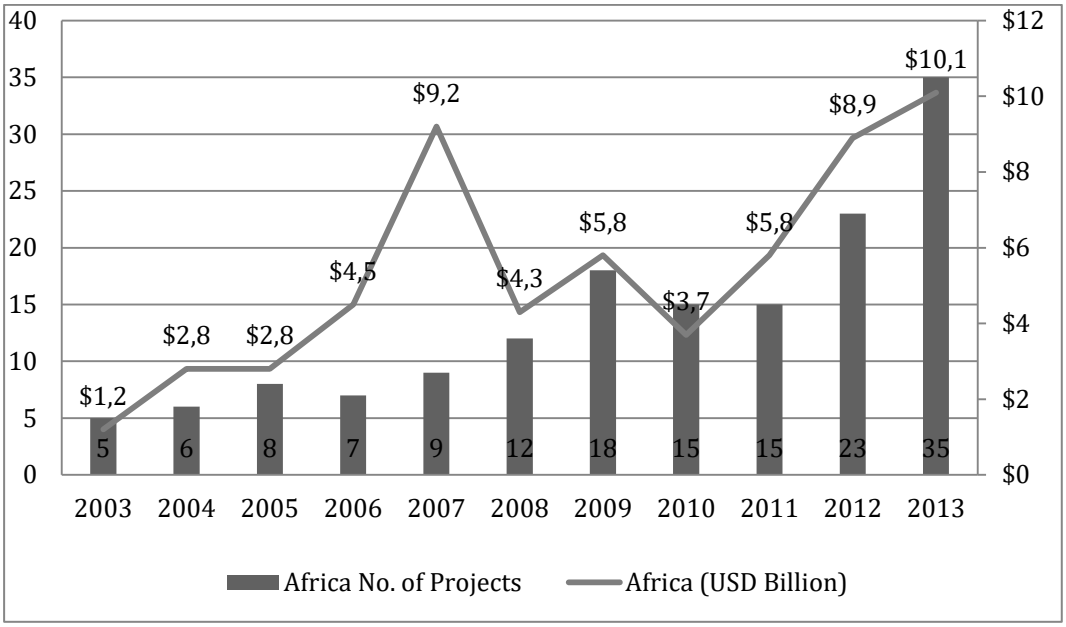


Figure 2-2: Africa: Growth in Project Finance 2003-2013 (Dornel, 2014)

The number of projects was 584 in 2013 and lower than the 615 closed in 2010 and 2011 inferring that the size of individual transactions increased on average. In excess of 5000 project finance transactions were closed over this period with debt raised in excess of US$ 2 trillion. Sub-Saharan Africa accounted for a mere 3% of the overall debt raised and 153 transactions (Dornel 2014). The leading project finance countries in Sub-Saharan Africa are strongly driven by the resources/extractive sector particularly in oil, gas, and mining. Table 2.3 reflects the dominance of countries such as Nigeria and Ghana primarily driven by significant project finance investments in oil. Specifically, 20 of the 28 of the Nigerian transactions are in the commodities sector and 12 of the 14 transactions in Ghana relate to commodities. In contrast only 15 of South Africa's 45 transactions are in extraction, with the remaining 30 diversified across other sectors of the economy. The leading country by deal size Nigeria, has double the number of deals relative to second placed Ghana. South Africa however scores the largest number of transactions at 45 reflecting the greater level of development of capital markets relative to Nigeria despite average transaction size being significantly lower than Nigeria and Ghana. The average deal size of US$ 410 million is distorted upwards by the single Madagascar transaction and excluding this would be US$ 397 million.

Table 2.3: Top 10 SSA Countries: Deal Size and Number of Projects (All Sectors) - (Dornel, 2014)

Country	No. of Projects	Deal Size ($M)	Average Deal Size ($M)
Nigeria	28	17, 793	635
Ghana	14	10,925	780
South Africa	45	9,928	221
Angola	8	4,460	558
Madagascar	1	2,100	2,100
Zambia	7	2,047	292
Gabon	6	2,018	336
Ivory Coast	8	1,399	175
Kenya	9	1,357	151
Mozambique	4	1,327	332
Total	**130**	**53,354**	**410**

The dominance of South African project finance by number of projects on total deal size in the non-extractive industries in Table 2.4 below is in part attributable to South Africa's more diversified economy including its telecommunications, power, transport, manufacturing and services sectors. Despite Nigeria having a larger economy than South Africa, and a population in excess of triple that of the latter, the more sophisticated, deeper and broader capital markets support the closing of a greater number of transactions in the non-extractive sector.

Implicit in this observation is that a greater proportion of debt capital for these projects in South Africa is sourced from domestic as opposed to international capital markets. The domestic setting of these transactions would also explain the significantly lower average deal size of South African transactions at US$ 301 million as opposed to the Nigerian transactions that had an average deal size of US$ 935 million. Non-extractive project finance deals are relatively few numbering 59 compared to the 130 deals observed in total. Non-extractive projects are also concentrated in South Africa with 30 of the 59 projects occurring in South Africa.

Table 2.4: Top 10 SSA Countries: Deal Size and Number of Projects (Non-Extractive) - (Dornel, 2014)

Country	No. of Projects	Deal Size ($M)	Average Deal Size
South Africa	30	9,039	301
Nigeria	8	7,477	935
Kenya	8	1,157	145
Ivory Coast	3	996	332
Uganda	1	867	867
Mozambique	3	835	278
Ghana	2	498	249
Tanzania	1	340	340
Angola	1	250	250
Cameroon	2	203	102
Total	**59**	**21,662**	**367**

The comparative distribution of project finance transactions by value in Sub-Saharan Africa versus the global picture is instructive (See Figures 2-3 and 2-4 below). The oil and gas sector is extremely dominant and absorbed 46% of project finance debt capital in the ten years up to 2013. This can be explained by the significant increase in production in key African oil producers such as Nigeria and Angola, and the incremental investment required. Traditional oil producers were also joined by emerging African oil producers such as Ghana and Uganda where significant new discoveries were found and developed, and players like Mozambique where large investments were attracted into newly confirmed natural gas reserves. It is noteworthy that oil and gas discoveries have not to date resulted in major downstream investments in refineries or liquid natural gas plants that would have implicitly increased project finance capital raised for the industrial sector form the small level of 4% at which it stood in 2013. This may be attributable the regulatory and business environments in oil and gas endowed countries not being sufficiently conducive to attract this investment. The mining sector at 17% attracted as much capital as the power sector. With electricity generation becoming a focal point in both national and regional development initiatives it is expected that the power sector will surpass mining if effective regulatory frameworks are established that are amenable to the deployment of project financed power plants.

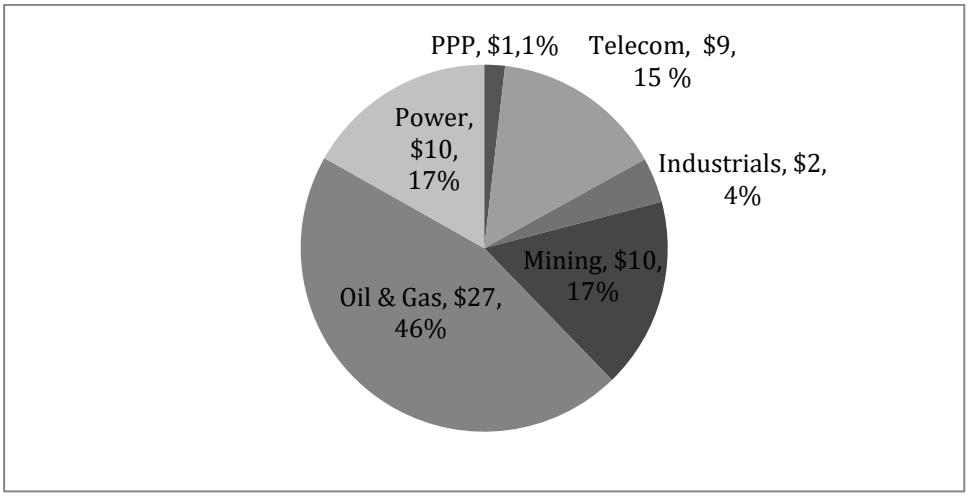


Figure 2-3: Africa Project Finance deal by Sector (2003-2013, US$bn) - (Dornel, 2014)

Despite attracting only 15% of project finance debt capital the telecommunications sector is having a significant impact on the economic, social and political life of the African continent. The period up to 2013 heralded the wide scale availability of broadband across many parts of the continent facilitated by a number of project financed undersea cables linking the continent to other parts of the world. It is noteworthy that the roads and transportation sector failed to feature in the above analysis on account of the paucity of project finance capital it attracted.

In contrast the global sectoral breakdown of project finance by value is more evenly distributed across sectors. The largest sector over the period related to the power sector that saw huge investments in developed markets including North America and Western Europe, and also in emerging market economies in Asia such as China. In developed countries power market reforms encouraged and enabled large new investments, while in emerging Asian markets, a blend of state led and private initiatives attracted project finance capital. Roads and transportation was the second largest sector at 22% reflecting the large investments in logistical infrastructure to move people and goods by many countries. Investment in Africa with respect to this sector is very low in comparison. Global mining and oil and gas projects accounted for 27% of project finance funding compared to 63% for Africa reflecting the secondary role played by the extractive sectors in most world economies that are dominated by secondary and tertiary activities. While this simple comparison offers useful insights into project finance in Africa relative to a global aggregation, the interpretation and analysis noted would be even more stark if the comparison was between Africa and developed markets such as North America and Western Europe alone.

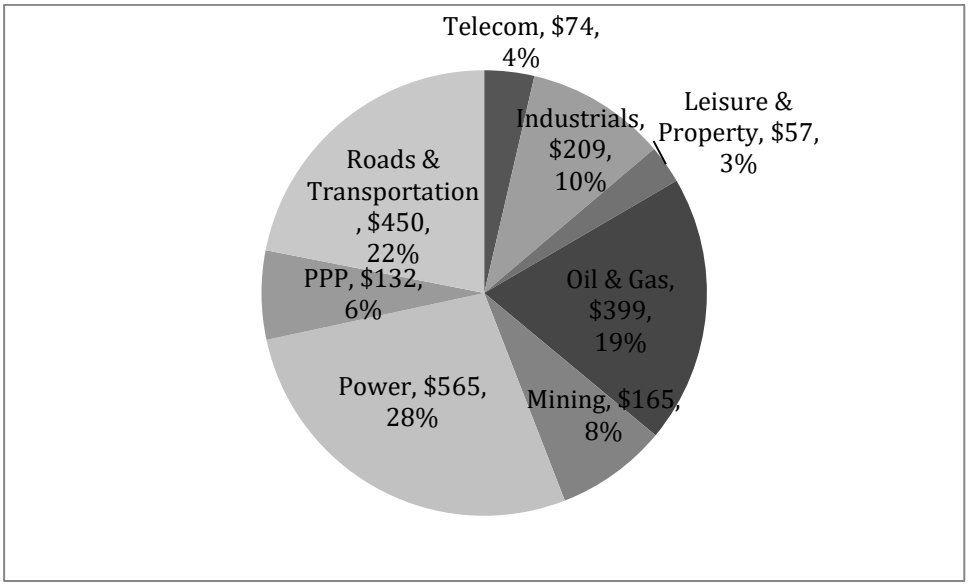


Figure 2-4: World Project Finance deal by Sector (2003-2013, US$bn) - (Dornel, 2014)

The data confirms the need for African countries to diversify their economies from extractive activities into other economic sectors. Such diversification can be enabled by appropriate investments in enabling infrastructure in the telecommunications, roads and transport, and power sectors.

2.9.2.2 The impact of project finance ratios on capital structure

This section reviews key ratios used by bankers, sponsors, and other capital providers in project finance transactions to determine the bankability and sustainability of a project. The Debt Service Cover Ratio (DSCR) is an assessment of the degree to which operational cash flows in a given year are able to service the principal. It is calculated by dividing net operating income with total debt. The higher the DSCR, the greater the comfort lenders will have of the project's ability to service its obligations towards them. A DSCR of 1 or below would indicate a marginal project that could become unsustainable due to earnings before interest and taxation generated being insufficient to cover debt servicing and loan repayment requirements. DSCRs vary from one sector to another. Gatti's (2008) collation of DSCRs across sectors from various market sources are illustrated below in Table 2.5. The highest DSCRs occur in power plants where no contractually bound buyer of the output or off take agreement is in place. The higher DSCR may be necessitated by the potential volatility of revenue on account of unstable demand in the event that there is no off

take agreement. The power generation sector is highly capital intensive and lenders may demand higher DSCRs on account of their larger exposures.

Table 2.5: Project Finance DSCRs in Various Sectors (Gatti, 2008)

Project Sector	Average DSCR
Power:	
Merchant Plants (plants with no off take agreement)	2 - 2.25
With a tolling agreement	1.5 -1.7
In cases involving regulated business	1.3 - 1.5
Transportation/shipping	1.25 - 1.5
Telecom	1.2 -1.5
Water	1.2 -1.3
Waste to energy	1.35-1.4

As soon as a tolling agreement is in place DSCRs drop significantly from 2.25 to 1.7. This confirms the credit enhancement and risk mitigating virtues of tolling and off take agreements.

The Loan Life Cover Ratio (LLCR) is an assessment of the ability of the project company to repay the outstanding loans based on a comparison of the total debt burden relative to operating cash flows forecast over the duration of the loan. It is computed by taking the present value of operational cash flows of the project over the life of the loan, adding existing debt reserves, and comparing this to the outstanding debt at a point in time. Again, the higher the LLCR, the greater the comfort lenders will have of the project's ability to service its obligations towards them over the entire duration of the venture. An LLCR of 1 or lower indicates that the project is not viable and would be unable to compensate lenders of their principal and interest expectations. LLCs vary from one sector to another. Gatti's collation of LLCRs across sectors from various market sources are illustrated below in Table 2.6.

Table 2.6: Project Finance LLCRs in Various Sectors (Gatti, 2008)

Project Sector	Average LLCR
Power:	
Merchant Plants (plants with no off take agreement)	2.25 - 2.75
With a tolling agreement	1.5 -1.8
In cases involving regulated business	1.3 - 1.5
Transportation/shipping	1.4 - 1.6
Telecom	n.a
Water	1.3 -1.4
Waste to energy	1.45-1.5

As observed with the DSCRs, the highest LLCRs occur in power plants where no off take agreement is in place. There is a significant drop in the LLCR from 2.75 to 1.8 as soon as a tolling agreement is in place. A more accommodating derivative of the LLCR is the Project Life Cover Ratio (PLCR). The PLCR is identical in all respects except for the fact that it incorporates operational cash flows over the entire duration of the project, rather than simply cash flows to be received over the loan period.

Project finance arrangements allow the capital structure of an entity to be studied with greater clarity and fewer distractions or moving variables. This is due to the fact that each project is ensconced in a special purpose vehicle and the capital structure effectively incorporates the decision making process of that particular project alone from conceptualisation.

2.9.2.3 Risk management in project finance

Shen-fa and Xiao-ping (2009) go as far as to define project finance as a process of risk allocation. This observation derives from the recognition of the many and divergent stakeholders in a project finance arrangement. The risks a project faces during the span of its lifecycle can be broadly summarised into four major stages namely, development, design, engineering, procurement and construction, start up, and operations (Gatti, 2008). In many developing markets political risk is also a major consideration. Political risk may manifest as expropriation, currency convertibility and transferability, amended regulations, and the potential for political violence. Frequently development finance institutions such as the World Bank may be included as sponsors or lenders as a way of mitigating political risk (Hainz and Kleimeier, 2011). In a study conducted on 900 projects in 53 countries between 1990 – 2006, minority stakes by host governments were observed to mitigate against political risks of project finance transactions (James and Vaaler, 2013).

Weber and Alfen (2010) summarise and group risks in project finance transactions into two categories, namely, general risks (Table 2.7) and project specific risks (Table 2.8). They identify the parties in a project finance arrangement based placed to manage the risk and to whom each risk is allocated. From a risk perspective project finance presents unique challenges for the providers of capital. The relative bargaining power of the funders and the contracting parties' changes markedly as soon as the infrastructure has been sunk (Dailami and Leipziger, 1997).

Table 2.7: General Risks (Weber and Alfen, 2010)

General Risks	Risk Description	Risk Allocation
1 Market risk	- Sales lower than expected (demand risk) - Change in the price of the product/service offered (price risk) - Existence or supply/delivery of raw materials/primary products (supply risk) - Increase in the cost of production factors e.g. raw materials (price risk)	- Operator - Project SPC
2 Interest rate risk	- Changes in interest rates in the case of variable-interest rate agreements	- Project SPC - Commercial banks
3 Exchange rate risk	- Changes in the exchange rate between the local currency generated by the project and the currency in which the project costs/loans are denominated	- Project SPC - Commercial banks
4 Environmental risk	- Change in environmental regulations - Receipt of government approval	- State - Project SPC
5 Force majeure	- Strikes - War - Terrorism - Earthquakes and other natural disasters	- State - Project SPC - Insurers
6 Political/ Country risk	- Changes in legislation - (De)regulation - Nationalisation - Seizure - Expropriation - Breach of contract/concession - Currency transfer - Currency conversion - Changes in tax rates & tax legislation - Public acceptance	- State - Project SPC - Sponsors - Commercial banks - Multilateral institutions - Export credit agencies (ECA) - Insurer
7 Legal and contractual risk	- Failure to receive approvals, licenses and concessions - Effectiveness and enforceability of contracts and agreements - Poor functionality of the judicial system	- State - Project SPC - Sponsors - Commercial banks - Multilateral institutions - Export credit agencies (ECA) - Insurer

Further, the greatest risks are at the beginning of the project with a general decrease in operational risk as the project continues over a period of time. Contractors are regulated from fundamentally changing their agreed terms of participation in the project by way of extensive legal contracts, service level agreements and PBC.

Table 2.8: Project Specific Risks (Weber and Alfen, 2010)

Project Risks	Risk Description	Risk Allocation
1 Construction and completion risk	- Planning amendments by the principal - Excess costs due to delays in the planning or construction phase - Construction overruns not attributable to planning errors - Existence of transport/infrastructure	- General contractor - Project SPC - State (in case of amendments by the principal)
2 Technical and performance risk	- Use of tried and tested technology from known manufacturers that is adequate for the operating process - Suitable climate or soil quality (for the construction of larger plants)	- Producer - Operator - Project SPC
3 Financing risk	- Changes in contractual conditions between the signature date and the provision of financing	- Project SPC - Commercial banks - Sponsors
4 Syndication risk	- Ability to syndicate/place loans	- Commercial banks
5 Operational risk	- Excess operating/maintenance costs - Interruption of operation - Selection of operator/partner	- Operator
6 Realisation risk	- Market value or functionality of the asset at the end of the term may be lower than previously assumed	- Depending on the contract model either with the sponsors/project SPC or with the state
7 Counterparty/ credit risk	- Ability of contractual partners to provide products, services or payments	- All contractual parties

Many of these risks can be eliminated or effectively managed at the inception of a project. The ability to identify, appraise, and mitigate risks throughout a projects life is therefore an essential part of project finance.

2.9.3 Public Private Partnerships in Project and Infrastructure Finance

Public-private partnerships (PPP) are an increasingly popular method for the procurement of public infrastructure using project finance. PPPs are established where a public authority commissions the design, construction, operation, maintenance and financing of a public infrastructure project from a private consortium within a single contractual and institutionalised framework. They have gained increasing prominence in many parts of the world as their governance arrangements have an unparalleled ability to bring together public, private, and communal resources and generate synergistic benefits (Bettignies and Ross, 2004). A significant portion of PPPs are funded using the project finance method and include toll roads, hospitals, power plants, airports, oil and gas facilities, and other such

capital intensive infrastructure. Despite the resurgence of PPP, the academic literature is contradictory regarding the efficacy of these arrangements.

Hodge and Greve (2007) submit that the objective of establishing PPPs is a desire the blend the positive attributes of the private and public sectors in the provision of public services. This partnership is further entrenched by the fact that PPPs require extensive risk sharing between these key stakeholders and a long-term commitment to the underlying project. There are two key dimensions that inform PPPs, namely, how they are financed, and how they are governed. In the late 20th and early 21st century motivations for PPPs have changed. The initial justification was driven by concerns about the elevated debt levels of the public sector, and that government should focus its financial resources on priority areas, leaving the private sector to fund implicitly lower priority objectives. In more recent times a secondary motivation has been value for money in the provision of public infrastructure (Edwards et al. 2004).

2.9.3.1 Empirical results on PPPs

The empirical results on PPPs in many regions of the world are mixed and contradictory, and appear to suffer many of the challenges associated with privatisation. Hall (1998) challenges the proposition that PPPs enable governments to free up capital resources, and potentially increase the infrastructure stock by mobilising private sector capital. Hall's (1998) contention based on the funding of public infrastructure in the UK in the 1990s concludes that private funding of infrastructure through PPPs simply displaced previous government funding, and did not lead to an increase in infrastructure investment levels. Furthermore, the study challenged the assertion that the government fiscal budget was relieved on account of private funding, as governments simply paid for the infrastructure over extended periods of time as opposed to significant upfront settlements. Exceptions were noted where users of the infrastructure paid for it via tolls and related fees, in which case pressure on the government budget was relieved. Regarding the hypothesis that PPPs result in better value for money, the study concluded that this was only the case where the efficiency gain derived from public sector participation were not ameliorated by the higher funding costs on projects. Pollit (2002) gave a cautionary approval of UK PPPs judging them to be successful for prisons and roads, but of questionable value for hospitals and schools. This study was consistent with the findings of Mott-Macdonald (2002) that reported UK PPPs on balance being delivered on time and on budget far more than with exclusively government run projects. The detractors of the merits of

UK PPPs include Pollock, Shaoul, and Vickers (2002) that argue that the Private Finance Initiative (PFI) has failed to fulfil its objectives in a wide range of services including roads, hospitals, prisons, and rail transportation infrastructure.

Commentators in the USA, Bloomfield, Westerling, and Carey (1998) criticise PPPs in the Massachusetts prison system arguing that they were 7.4% more expensive than conventional financing and that the purveyors of these arrangements understated the costs and risks to the state governments, whilst inflating the potential benefits. In a similar vein, Greve and Ejersbo (2003) observed PPPs in the Netherlands to result in higher taxes on citizens and higher debt levels for government institutions. In Australia, Walker and Walker (2000) argue that PPPs are a sleight of hand that impoverish the fiscus based on deceitful financial and accounting engineering. The authors also criticize the exorbitant profits made by private sector players on PPPs noting that the return on the Sydney M2 Motorway was an exorbitant 24.4% for the private investors.

More recent empirical research into PPPs also yields mixed results. Pollit (2005) established the popularity of this mode of infrastructure development in the UK, and notes that 15 – 20% of the UKs capital budget is raised through this mechanism annually. While criticisms include the lengthy and costly bidding process, together with the small number of bidders, the overall conclusion based on 5 case studies is overwhelmingly positive. In contrast Shaoul (2005) questions the rationale of the PFI contending that risks are not in fact transferred to the private sector, the value for money methodology appraisal is flawed and misleading, projects are distorted detrimentally when the PFI mechanism is applied, that the PPPS are exorbitantly expensive, and accountability is compromised. In the USA Boardman, Poschmann, and Vinning (2005) contend that PPPs are difficult to justify, as transaction costs relative to traditional infrastructure provision methods are difficult to quantify. In addition, the public sector lacks the management skills to administer PPPs, and there is an inherent bias against the discontinuance of unsuccessful projects by public sector officials. The authors note how private sector players are often more sophisticated in there arrangements to ensure they are fully compensated for their risk taking, including declaring bankruptcy, frequently resulting in losses that should have been fully borne by the private sector, also being shared with the state.

Whilst the academic literature on PPPs in Sub-Saharan Africa is limited the benefits and challenges are consistent with those observed in other regions of the world, and difficulties tend to be more amplified by a poorer

and less equitable socio-economic setting. Farlam (2005) conducts a study of 8 case studies that are a representative sample of PPPs implemented in Sub-Saharan Africa over the decade spanning 1994 to 2004. The cases are extracted from South Africa, Mozambique, Uganda, Gabon, and Tanzania, and cover the transport, telecommunications, water and sanitation, power, and eco-tourism sectors. The outcome of this study reveals that PPPs are most successful where there is comprehensive planning, good communication, high levels of commitment from all parties, and effective monitoring, regulation, and enforcement by government. Because of their complexity, PPPs were observed to be more successful in the ports, telecommunications, transport, and eco-tourism sectors. Significant difficulties and challenges were noted in power and water projects. Advantages that were derived from successful PPPs included fiscal benefits, efficiency gains, increased private sector development, and development of local financial markets (Ogunbiyi, 2004). The failed PPPs owed their collapse to a combination of unscrupulous, predatory, and profiteering private sector participants, who were more astute in negotiating contractual terms that were in their favour, imbalanced and inequitable (Farlam, 2005).

Miraftab (2004) makes similar findings regarding the negative aspects of PPPs in South Africa. The corrosive aspects of PPPs are however attributed to inequitable power sharing arrangements between private sector participants and welfare driven public sector institutions. Using the example of a housing subsidy PPP aimed at providing affordable housing for impoverished communities, Miraftab (2004) attributes a significant contributor to its failure (volumes and quality goals were not achieved) to corporate interests such as banks and construction companies shaping the agenda, leaving the poor and their representative organisations vulnerable and participating in processes already shaped by others. While technical planning and execution of PPPs is essential, these contracting arrangements are insufficient to address the power imbalance inherent in PPPs in Sub-Saharan Africa. Consequently particular attention must be paid to the social, economic, cultural, and political environment in which the PPP is being executed, and the state plays a critical role in mediating between community based groups, local authorities, and private sector developers.

To conclude this section, the academic literature contains conflicting perspectives regarding the merits, criticisms, and cost and benefit implications of PPP arrangements. Whilst there is clarity on PPPs as an institutional and contractual arrangement leveraging the strengths of public

and private sector participants, the actual practice appears to result in outcomes that may not be equitable (Hart, 2003). More often than not this outcome is skewed to the benefit of private investors, and to the detriment of the public purse. The academic literature on PPP is limited in addressing the interests of the poor and power imbalances (Fiszbein and Lowden 1999; Bennet 1998). Its focus on forms of contracts and concessions misses an important determinant of successfully executed PPPs, specifically the incorporation of socio-economic, political and cultural considerations (Miraftab (2004).

2.10 Africa's infrastructure deficit

This section begins by highlighting the magnitude of the African infrastructure deficit by comparing a broad set of infrastructure development indicators between the continent and other regions of the world. This is followed by an assessment of the origins and causes of the infrastructure deficits. The World Economic Forum Global Competitiveness Report (Schwab and Martin, 2015) lists infrastructure as the second of twelve pillars by which countries achieve international competitiveness. Africa emerges as the least competitive global region, in significant part on account of a profound infrastructure deficit. In addressing the importance of the infrastructure pillar the authors of the report declare infrastructure to be a catalytic enabler by:

- helping effective functioning of commerce;
- being an important consideration in determining the location of economic activities;
- reducing geographical distances and integrating, domestic, regional and international markets cost effectively;
- reducing income inequalities and poverty;
- facilitating access to those residing in marginalised and less developed communities;
- supporting entrepreneurial activity by easing the provision of goods and services to markets;
- allowing factories to function unimpeded by energy constraints;
- facilitating the free flow and exchange of information; and
- ultimately improving overall business efficiency.

Table 2.9 shows a comparison of Africa’s infrastructure stock in low and middle-income countries, relative to other low and middle-income countries in the world. In the most regressive sectors, African low-income countries have only 26% of the paved roads, 7% of the equivalent internet density, and 12% of the generation capacity.

Table 2.9: International Perspectives' on Africa's Infrastructure Deficit (Yepes et al., 2008)

Normalised units	African low-income countries	Other low-income countries	African middle-income countries	Other middle-income countries
Paved-road density	34	134	284	461
Total road density	150	29	381	106
Main-line density	9	38	142	252
Mobile density	48	55	277	557
Internet density	2	29	8.2	235
Generation capacity	39	326	293	648
Electricity coverage	14	41	37	88
Improved water	61	72	82	91
Improved sanitation	34	53	53	82

Note: Road density is measured in kilometres per 100 square kilometres of arable land; telephone density in lines per thousand populations; generation capacity in megawatts per million populations; electricity, water and sanitation coverage in percentage of population.

The picture is more favourable with African middle-income countries achieving proportionally 61% of paved roads, 3% Internet density (worse than the low income country gap), and 45% generation capacity, relative to the infrastructure stock of their other middle-income peers. The magnitude of the infrastructure gaps would have been more acute had a comparison been performed with developed high-income countries. The cost of infrastructure services depicted in Table 2.10 relative to other developing regions reveal the inefficiencies of the existing infrastructure stock. Power tariffs at their lowest are only 40% of the equivalent charged by other developing regions. This implies under-pricing and/or subsidisation of electricity in a number of African countries. At the other extreme, the highest power tariffs in Africa are 460% of the equivalent in other developing regions. This dichotomy may be partly attributable to inefficiencies in public sector providers of electricity, and the extensive use of standalone generators by retail and commercial consumers.

Table 2.10: Africa's High Cost Infrastructure (Foster and Briceno-Garmendia, 2010)

Sector	Africa	Other developing regions
Power tariffs ($ per kilowatt-hour)	0.02-0.46	0.05-0.1
Water tariffs ($ per cubic meter)	0.86-6.56	0.03-0.6
Road freight tariffs ($ per ton-kilometre)	0.04-0.14	0.01-0.04
Mobile telephony ($ per basket per month)	2.6-21.0	9.9
International telephony ($ per 3-minute call to United States)	0.44-12.5	2.0
Internet dial-up ($ per month)	6.7-148.0	11

Note: Ranges reflect prices in different countries and various consumption levels. Prices for telephony and Internet represent all developing regions, including Africa.

Water tariffs are 2766% more expensive at the lower end and 993% dearer at the upper end of the comparison. Similarly, road freight (a proxy for logistic costs) is 400% more expensive on the lower end and 350% more costly on the upper end relative to other developing markets. These metrics reveal both the inadequacy of the current infrastructure stock, but also its relative inefficiency culminating in the brake it puts on socio-economic development.

The African infrastructure annual funding deficit has been estimated at approximately US$ 93 billion. This includes fresh capital expenditure together with on-going operation and maintenance requirements for both existing and newly commissioned infrastructure stock. Of this US$ 93 billion, the most significant funding requirement is for investment in power generation and amounts to US$ 40.8 billion (43.7%). During a tour of Africa in June 2013, President Obama of the United States identified Africa's power deficit as crippling to socio-economic development and pledged an amount of US$ 7 billion over a five-year period to contribute to remedying this deficiency (US Aid, 2013). The second largest requirement is in the water and sanitation space requiring 23% of the total funding requirements. Followed by transport (20%), ICT (10%), and irrigation (4%) respectively.

Table 2.11: Spending Needs for Sub-Saharan Africa US$ billions (Foster and Briceno-Garmendia, 2010)

Infrastructure sector	Capital expenditure	Operation and maintenance	Total spending
ICT	7.0	2.0	9.0
Irrigation	2.9	0.6	3.4
Power	26.7	14.1	40.8
Transport	8.8	9.4	18.2
WSS	14.9	7.0	21.9
Total	**60.4**	**33.0**	**93.3**

While this funding gap may appear daunting, a detailed breakdown of how it can be resolved is more hopeful. In Table 12.12 the current capital expenditure by African countries already amounts to US$ 45.3 billion. Furthermore, significant efficiencies can be realised by targeted interventions in the existing infrastructure stock that could yield gains equivalent to US$17.4 billion per annum. The true funding gap therefore is a more manageable US$ 30.6 billion per annum.

Table 2.12: Finding Resources: The Efficiency Gap and the Funding Gap (Foster and Briceno-Garmendia, 2010)

Item	Electricity	ICT	Irrigation	Transport	WSS	Cross-sector gain	Total
Infrastructure spending needs	(40.8)	(9.0)	(3.4)	(18.2)	(21.9)	n.a.	(93.3)
Existing spending	11.6	9.0	0.9	16.2	7.6	n.a.	45.3
Efficiency gap	6.0	1.3	0.1	3.8	2.9	3.3	17.4
Gain from raising capital execution	0.2	0.0	0.1	1.3	0.2	n.a	1.9
Gain from eliminating operational inefficiencies	3.4	1.2	-	1.9	1.0	n.a.	7.5
Gain from tariff cost recovery	2.3	-	-	0.6	1.8	n.a.	4.7
Potential for reallocation	n.a.	n.a.	n.a.	n.a.	n.a.	3.3	3.3
Funding gap	**(23.2)**	**1.3**	**(2.4)**	**1.9**	**(11.4)**	**3.3**	**(30.6)**

Finally, the African continent registers stark differences across regions in terms of infrastructural scarcities. On a fundamental basis the SADC region appears to manifest a greater quantity and quality of infrastructure stock. The relatively low population densities in Southern Africa relative to East and West Africa may support this observation.

Table 2.13: Intraregional Perspectives' on Africa's Infrastructure Deficit (Foster and Briceno-Garmendia, 2010)

Normalised units	ECOWAS	EAC	SADC	Central	Middle Income
Paved-road density	38	29	92	4	284
Total road density	144	362	193	44	381
Main-line density	28	6	80	13	142
Mobile density	72	46	133	84	277
Internet density	2	2	4	1	8.2
Generation capacity	31	16	176	47	293
Electricity coverage	18	6	24	21	37
Improved water	63	71	68	53	82
Improved sanitation	35	42	46	28	53

Note: Road density is measured in kilometres per 100 square kilometres of arable land; telephone density in lines per thousand populations; generation capacity is megawatts per million populations; electricity, water and sanitation coverage in percentage of population.

Table 2.13 above shows the SADC region is followed comparatively by ECOWAS, then the EAC, and finally, the most infrastructures poor part of the continent appears to be Central Africa. Central Africa does reflect competitive infrastructure stock in the category of generation capacity, possibly on account of the hydroelectric capacity ensconced in mega developments such as the Grand Inga Project in the Democratic Republic of Congo. It is notable for all regions and in all infrastructure sectors, the level of infrastructure development is significantly below the equivalent stock for middle-income countries in the world.

2.10.2 Causes of Africa's infrastructure deficit

There are four principal factors contributing to the infrastructure deficit in Africa since 1960. These are a low level of capital accumulation, the high price of infrastructure investments on the continent relative to other regions, low returns on investment, and geographical disadvantages (Ndulu et al 2005). Since 1960 African countries rate of capital accumulation has been significantly lower relative to other developing countries. The ratio of investment relative to gross domestic product (GDP) in 1985 stood at 9.5% for Africa relative to 15.6% in other developing countries. Using the revised and updated Gross Fixed Capital Formation (GFCF) as a percentage of GDP measure and comparing individual countries for the years 2011 and 2012, a number of observations can be made from Table 2.14. Firstly, GFCF appears to have increased significantly since 1985. However, America, Germany and Japan indicate GFCF equivalent to the most progressive African economies in spite of the fact that these countries have some of the most extensive and efficient infrastructure stock globally. This observation may indicate that the current investment levels of countries such as South Africa and India are insufficient to catch up with countries in the developed world.

Table 2.14: Gross Fixed Capital Formation (% of GDP) – (The World Bank, 2014)

	2011	2012		2011	2012
South Africa	18.97	19.16	United States	18.21	18.64
Egypt	16.91	15.62	Japan	20.58	21.17
Kenya	20.40	20.39	Germany	18.13	17.65
Ethiopia	27.94	34.58	China	45.59	46.82
Niger	34.68	38.90	India	30.63	29.59
Mozambique	36.73	48.30	Brazil	19.28	18.14

China has the highest rate of GFCF of any of the listed countries at 46.82% in 2012. This confirms our expectation on account of the infrastructure led growth that the government has purposefully driven.

The high price of investments is the second reason for lower rates of GFCF. Ndulu et al (2005) estimate the price of executing an infrastructure projects in Africa to be 70% higher than in Organisation for Economic Co-operation and Development (OECD) countries, or in East Asia. The contend that if Africa had equivalent investments costs to the OECD and East Asia, this could have increased economic growth by 0.44 percentage points between 1960 and 1994. Some of the contributors to the high cost of investing include higher transport costs for capital goods, and that much of the capital equipment is imported. The third reason for comparatively lower GFCF is the low returns on investment. The lower returns may initially occur as a result of the higher investment costs explained above, and are further exacerbated by other factors. These include the poor quality and sequencing of investment choices, including pandering to white elephant projects. Another factor is the sub-optimal utilisation of existing capacity and lack of human capital such as engineering skills for complex capital investments (Ndulu et al 2005).

The final reason for the lag in GFCF since 1960 relates to geographical disadvantages. Africa is fragmented into 54 countries, many of which are small, landlocked, and economically sub-scale. As a result, the continent as a whole and country regions within the continent do not harness the economies of scale that could arise from massive cross country and regional infrastructure investment opportunities. Compounding this difficulty is the fact that countries have opted to act unilaterally in the development of infrastructure undermining harmonising infrastructure standards and protocols. 40% of sub-Saharan Africa resides in landlocked countries where transport costs are 50% higher and trade volume 60% lower (Ndulu et al 2005). Population densities in Africa are relatively lower than other regions of the world, and the majority of the population resides in rural areas. The geographical isolation of many sub-Saharan African countries from large markets in Asia, the Americas and Europe has the impact of curtailing commercial opportunities (Limao and Venables 2000). Whilst this geographical disability can be largely compensated for by way of connecting infrastructure, this is exactly the challenge the continent faces. Africa not only faces challenges regarding external networks, but also internal intercountry networks. This makes it difficult for African countries to trade within the continent and amongst one another. Transport costs of intra-regional trade amount to US$ 7,600 for Sub-

Saharan Africa whilst the equivalent for Latin America and the Caribbean is US$ 4,600, and East Asia is below US$ 4,000 (Ndulu et al 2005). The final geographical disadvantage relates to the burden of tropical diseases such as malaria that have a degrading effect on life expectancy and strip away at the rate of accumulation of human capital.

The above observations capture the reasons for the lag in GFCF in Sub-Saharan Africa. They are compounded by a colonial legacy where infrastructure was focused on an extractive and commodity driven economic model that neglected beneficiation of raw materials, and inter country connectivity. Post colonial instability in many African countries further compounded inadequate investment in infrastructure and the establishment of institutions and a regulatory framework that would foster GFCF. The consequence of these significant infrastructure deficits is to aggravate key socio-economic challenges the continent faces. These include the high levels of poverty, poor healthcare, inadequate water and sanitation, severe electricity shortages, low productivity in agriculture, sub-standard education facilities, unemployment, and overall development.

2.11 Conclusion

The literature review in this chapter can be classified into three broad sections. The first part examined the major theories relating to the formulation of capital structure. The second part considered the role of agency theory both in the determination of capital structure, and in the design and management of contracts between a firm and third party suppliers. The third part of the literature considered the structure and limited theoretical underpinnings of project and infrastructure finance (including PPPs) as a segment of the broader financial, economic, and organisational literature. It concluded with summarising the key infrastructure gaps on the African continent, together with the funding that would be required to address them.

The review has raised at least two important gaps in the literature. The first is the relatively limited research in the formulation of capital structure in Sub-Saharan Africa, including the applicability and prevalence of the static trade-off and pecking order theories. Implicit in this observation is the limited examination of what these theories predict versus the actions of firms and practitioners in practice. This deficit is acute in the area of project and infrastructure finance where very little research has been done as to the qualitative and quantative factors that inform the capital structure decisions in South Africa, Mozambique and Zimbabwe. It is important to accrue more knowledge in this respect as project and infrastructure

finance is expected to play a significant role in the rectification of the infrastructure deficiencies on the continent. The literature also appears to be lacking in regarding agency considerations within capital providers in project and infrastructure finance i.e. how does agency theory influence the capital structure and related arrangements in the interactions within sponsor consortiums and within lending consortiums. The existing literature largely treats equity providers and debt providers as two monolithic groups with little variation within each. Understanding how differences between sponsor and equity consortiums would allow useful insights as to optimal capital structure formulation in project finance. These differences and how they are addressed seem essential to successful capital structure formulation in project finance, and achieving financial closure. Importantly, it would be valuable to ascertain as to the degree to which capital structure may be more influenced by agency theory as opposed to mainstream capital structure theorems.

The second gap in the literature relates to how different legal, economic, social, and business contexts in the host countries may significantly affect the capital structure of projects. This is particularly important because the assumptions that inform the main capital structure theories are questionable in the developed world, and potentially entirely detached from reality in countries such as Zimbabwe and Mozambique, and to a lesser degree South Africa. Obtaining qualitative and deductive reasoning that incorporates the highly divergent business environments in these countries enables a deeper, authentic, and more comprehensive understanding of capital structure formulation.

The third gap in the literature relates to the limited examination of the risk management, contracting, and governance arrangements on projects in South Africa, Mozambique, and Zimbabwe. In this respect an enquiry into these issues using the lens of stakeholder theory and stakeholder agency theory, has the potential to yield important knowledge on the interactions between participants. The study will be able to assess the degree to which stakeholder theory is applicable, which strain of stakeholder theory has most resonance, and why this is the case. This is a potentially profound way of understanding holistically participant interactions. There is little analysis of these dynamics within the academic literature for projects in Sub-Saharan Africa. An analysis and understanding of these interactions would shed light as to how power is distributed across stakeholders, how risk is managed, the degree of corporate social responsibility, and how these arrangements differ from accepted project finance norms. This knowledge is expected to inform recommendations as to how to most

optimally design and manage contractual arrangements and stakeholder interactions, and to resolve conflicts of interests and disputes. Consistent with the capital structure gaps noted above, the degree to which stakeholder arrangements have been influenced by the different legal, political, economic, and contextual environment appears to be insufficiently researched. This research should yield important qualitative insights on stakeholder management.

A thesis that addresses the gaps in the literature detailed above will make an important contribution to bridging the gap between theories on capital structure and agency, that are rendered less relevant because the assumptions underpinning them are divorced from the reality of the socio-economic situations in South Africa, Mozambique and Zimbabwe. The main country specific explanatory and qualitative factors that inform the determination of capital structure and stakeholder arrangements in project and infrastructure finance will be extracted from a range of practitioners. This knowledge should arm academics and other project and infrastructure finance practitioners with better understanding, decision-making tools, and a clearer paradigm to view such transactions. This can enhance the execution of project and infrastructure finance in Sub-Saharan Africa, and contribute towards alleviating the massive socio-economic deficiencies highlighted in the introduction.

3 Research Methodology

3.1 Overview

The objective of the research is to extend the existing theory on project and infrastructure finance by investigating qualitative aspects of successful and failed transactions using the case study method. Explaining multifaceted phenomena including capital structure, governance arrangements and performance based contracting, risk management, and sustainability requires applying multiple theories connected with a common framework. Current frameworks are largely inadequate in capturing in a holistic manner these complex phenomena and how they interact with one another. This study applies an eclectic approach whereby the case study method enables complex and wide ranging data to be captured, and for this information to be analysed through the prisms of capital structure and agency theories. This approach enables holistic analytical framework that captures the variation, complexity, and breadth of project and infrastructure transactions.

Research types can be classified in accordance with the objective of the research, that is, is the research exploratory, descriptive, or explanatory in nature. An exploratory study is useful in seeking new insights and determining what is actually occurring. Descriptive research seeks to portray an accurate profile of persons, events or situations. Explanatory research attempt to establish causal relationships between variables by analysing a situation or problem (Saunders et al. 2009). Research can also be categorised into the two broad categories of quantative and qualitative research based on the data collection techniques and analysis procedures (Saunders et al. 2009). Quantative research techniques include methods of collecting data through questionnaires, established and reputable databases, or other methods that generate or use numerical data. This method emphasises quantification in the collation and analysis of data and a deductive approach in the relationship between theory and research. Social reality is viewed as an external and objective reality (Bryman and Bell, 2007). Qualitative research produces findings that are not arrived at using solely quantification and statistical procedures (Strauss and Corbin, 1998). This may include interviews, observation, and analysis of numeric data and non-numeric. The emphasis on qualitative research is on words rather than quantification in the analysis of data, and an inductive approach to the relationship between theory and research. The distinction between quantative and qualitative research in terms of the role of theory, epistemological issues and ontological concerns is not hard

and fast, and both categories can be effectively combined within a single research project (Bryman and Bell, 2007).

An important and growing criticism of academic research in economics in particular, but implicitly across business and finance, is a growing disconnect observed between theory and practice. This is particularly the case where theory needs to incorporate significant levels of human behaviour. Critics argue that whilst the theories and models espoused by academia offer neat, precise and predictable actions and outcomes, at times the unrealistic underlying assumptions that seek to make these theories overarching in nature, render them almost entirely detached from reality (Stiglitz, 2001). In a critique of the failure of academia to predict the international financial crisis and its impact that commenced in 2007, Colander et al (2009) contend that,

"The economics profession appears to have been unaware of the long build-up to the current worldwide financial crisis and to have significantly underestimated its dimensions once it started to unfold. In our view, this lack of understanding is due to a misallocation of research efforts in economics. We trace the deeper roots of this failure to the profession's focus on models that, by design, disregard key elements driving outcomes in real-world markets. The economics profession has failed in communicating the limitations, weaknesses, and even dangers of its preferred models to the public. This state of affairs makes clear the need for a major reorientation of focus in the research economists undertake, as well as for the establishment of an ethical code that would ask economists to understand and communicate the limitations and potential misuses of their models."

This disconnect between theory and practice has serious implications. Academic research that is perceived to be divorced from practice may continue to enjoy attention in academia, but is likely to be ignored or given short shrift in circles beyond. This includes an erosion of influence amongst practitioners in the respective fields, regulators, policy makers, and other important stakeholders. It is submitted that research that is more grounded in practice, with fewer and less exotic assumptions, my have lower prospects for universal applicability, but would have more resonance to a broader range of stakeholders on account of its more realistic assumptions and limitations, and authenticity and rootedness in the actual decisions of economic participants. The drive towards mathematical modelling in financial and economic research is in part motivated by a valid effort to instil rigor and testability to the theories, and to “prove” the underlying hypotheses. But a side effect of this mathematically modelled

approach has been to suggest financial and economic phenomena are binary, mechanical, and dualistic, and can be captured and expressed in formulas'. While this may be possible to achieve in the natural sciences such as physics and chemistry, mathematical congruency in the financial and economic sciences is arguably a more challenging proposition.

In choosing an appropriate methodology for this thesis, the author is acutely aware of the valid concerns regarding the disconnect between practice and academia. This is amplified by the observation that many underlying assumptions in the existing theories are founded on American, European, and northern hemisphere conditions. If they are questionable in the markets they are founded in, how much more questionable in markets in Sub-Saharan Africa where the contextual issues are very different and arguably extremely important?

This chapter on methodology begins by explaining the suitability of the qualitative research approach and introduces the case method. This is followed by an explanation of how the seven case studies were selected and how the cases were constructed and the data analysed. A discussion on measures taken to ensure the validity and reliability of data and the limitations of the study conclude the section on methodology.

3.2 The Suitability of a Qualitative Research Approach

According to Patton (1990):

"There are no formulas for determining significance [in qualitative research]. There are no ways of perfectly replicating the researcher's analytical thought processes. There are no straightforward tests for reliability and validity. In short, there are no absolute rules except to do the very best with your full intellect to fairly represent the data and communicate what the data reveal given the purpose of the study" (p. 372).

Qualitative research allows for the blending of a combination of research disciplines and theories encompassing a range of academic traditions including interpretivism, constructivism, cultural studies and critical theory (Chase, 2005). Bogdan and Bilken (2007) summarise the features associated with qualitative research as firstly exploring phenomena in a particular contextual setting. The emphasis on the contextual setting implies that human behaviour and decisions are strongly influenced by the context in which they are made, and this context is therefore essential in obtaining valid knowledge and understanding. In addition, practitioners

and stakeholders participating in the same phenomena may hold different views on the same observation or subject matter, and the importance of divergent and subjective views must be recognised and explored. Such a receptive approach to potentially conflicting perspectives allows a researcher to reflect and interpret the subject matter and phenomena based on the totality of the frequently divergent subject views collated. On account of the latter point qualitative research tends to be inductive in nature, with conclusions being arrived at after the weaving together of interconnected but contrasting pieces of data and evidence that contribute to a final conclusion. Qualitative research is also defined by its thick and comprehensive description of the underlying subject matter. This permits the utilisation of extensive forms of data to illustrate the observations including tables, illustrative charts, photographs, and pictures that enable a dense account of the phenomena (Bogdan and Bilken 2007).

Qualitative research by way of case studies on the seven projects selected is appropriate on account of the fact that the projects take place in three distinct countries with contextually unique attributes, which have a marked impact on how each of the projects is arranged. Secondly, each project occurs at a particular point in time with a unique set of political, economic, and social balance of forces that strongly influence the project dynamics. Thirdly the variety and number of stakeholders in each project make for a divergent array of viewpoints regarding the qualitative arrangements in the project, and provide a rich source of data to analyse, understand, and develop theory on each individual project, and also broader theoretical generalisations. Finally, the fleet of projects selected allow the researcher to conduct an in depth study of each case and its particular circumstances in a real life context and over a period extending a number of years.

3.3 An Introduction to the Case Study Method

Eisenhardt (1989) defines the case study as a research strategy that centres on understanding the underlying forces present within single settings. Case studies as a research method move from the fundamental basis that new knowledge, theory, and concepts can be derived through an inductive process by analysing a compartmentalised occurrence or phenomenon. Often the case study is rich in qualitative and empirical data, and suitable for in depth analysis and scrutiny (Eisenhardt and Graebner, 2007).

Researchers have used case studies extensively in finance and commerce to cover strategy, organisational change, mergers and acquisitions, product development, and project finance. Case studies have

also been used widely in other disciplines including medicine, psychology, sociology, anthropology and education (Rule and John, 2011). Case studies differ structurally from surveys and these dissimilarities are captured in Table 3.1 below.

The case study research method can result in the generation of the most interesting academic research regarding the building of theory, and case studies are one of the most extensively cited papers in the Academy of Management Journal with impact disproportionate to their numbers (Eisenhardt and Graebner, 2007).

Table 3.1: Comparison of case study and survey approaches (Rule and John, 2011)

Case Study	Survey
Intensive	Extensive
Depth	Breadth
Focuses on single instance	Focuses on representative sample
Usually qualitative but can combine qualitative and quantitative data and methods of analysis.	Usually quantitative

A reason why case studies are particularly effective is that unlike laboratory experiments where the testing is conducted in a defined control environment, case studies are contextualised within a unique 'real world' environment that encompasses many different aspects from one case study to another.

The compartmentalised nature of a case study allows for an issue to be explored and examined within manageable parameters and confines culminating in insights that are rich and relevant in revealing the underlying research subject. Furthermore, because case studies utilise empirical data, the outcome of research using case studies allows theory to be developed that is both testable and valid (Eisenhardt, 1989). This ability to extrapolate lessons from cases to similar research subjects provides a good framework for generating theory that is generally applicable and transferable to alternate situations (Rule and John, 2011).

The case study method also allowed the researcher to apply multiple theories within a single overarching framework. Specifically, the researcher incorporated capital structure, stakeholder and agency theories within each case. This was a critical part of the research formulation as it enabled different phenomena to be analysed discretely par case. In some instances where there were interconnections between phenomena, and in other areas where there were no or limited interconnections. The application of these theories under a unified case study enables the analysis and interpretation of multiple phenomena. Most importantly the

application of multiple theories within each case facilitated a pragmatic approach to exploring and explaining actions, events, and outcomes, in a manner congruent with the objective reality of the actors party to these projects. This helped address the critique that academic research in economics, finance and business, is frequently detached from reality, and as such of questionable relevance.

Detractors to the case study approach site two potential disadvantages. The first argument posits that the case study approach is often specific to a particular set of circumstances i.e. the research subject itself, and the conclusions derived cannot be applied in other conditions. As a result, the theory that is generated from a case study may be idiosyncratic and lacking in general applicability. Secondly, some of the outcomes of case study research have resulted in deep and detailed observations and intricate theories and concepts. The complexity of the theories generated however mean that they lose the potency of overarching and accessible theoretical concepts, and the ease of general application in the respective field is as a result compromised (Eisenhardt, 1989).

Table 3.2 below captures the case study process adopted to ensure a robust research process. The only divergence from the process below related to the fact that there was a single researcher as compared to a research team.

Table 3.2: Process of Building Theory from Case Study Research (Eisenhardt, 1989)

Step	Activity	Reason
Getting Started	Definition of research question	Focuses efforts
	Possibly a priori constructs	Provides better grounding of construct measures
	Neither theory nor hypotheses	Retain theoretical flexibility
Selecting Cases	Specified population	Constrains extraneous variation and sharpens external validity
	Theoretical, not random, sampling	Focuses efforts on theoretically useful cases – i.e., those that replicate or extend theory by filling conceptual categories
Crafting Instruments and Protocols	Multiple data collection methods	Strengthens grounding of theory by triangulation of evidence
	Qualitative and quantitative data combined	Synergistic view of evidence
Entering the Field	Multiple investigators	Fosters divergent perspectives and strengthens grounding
	Overlap data collection and analysis, including field notes	Speeds analyses and reveals helpful adjustments to data collection
	Flexible and opportunistic data collection methods	Allows investigators to take advantage of emerging themes and unique case features
Analysing Data	Within-case analysis	Gains familiarity with data and preliminary theory generation
	Cross-case pattern search using divergent techniques	Forces investigators to look beyond initial impressions and see evidence thru multiple lenses
Shaping Hypotheses	Iterative tabulation of evidence for each construct	Sharpens construct definition, validity and measurability
	Replication, not sampling, logic across cases	Confirms, extends and sharpens theory
	Search evidence for "why" behind relationships	Builds internal validity
Enfolding Literature	Comparison with conflicting literature	Builds internal validity, raises theoretical level and sharpens construct definitions
	Comparison with similar literature	Sharpens generalizability, improves construct definition and raises theoretical level
Reaching Closure	Theoretical saturation when possible	Ends process when marginal improvement becomes small

3.4 Case Selection

The selection of a population takes a different form when building a theory from cases. Due to the depth of case study research, and the variety of cases that may be present, conducting representative statistical sampling

using a database with homogenous characteristics is frequently not possible or appropriate. Consequently, the sampling in case study research is informed by the degree to which each case can replicate or extend the existing theory, and provide a platform to address the research questions posed. Eisenhardt (1989) posits that case studies can be a good starting point for the development of theory and recommends that a cross-case analysis consisting of a portfolio of four to ten case studies is likely to provide a sound basis for analytical generalisation. The use of multiple case studies is also useful in mitigating researcher bias and enhancing external validity as one of the criticisms frequently aimed at case studies is that the sample sizes are frequently small and the reliability of case study research is questionable.

Each case was selected based on its suitability to contribute to the conceptualisation of a new or enhanced qualitative project finance model. Each case chosen had the attributes and potential to illustrate matters relating to the existing and emerging theory on project and infrastructure finance by way of an inductive process (Siggelkow, 2007). Theoretical sampling was selected as the most appropriate selection method on the basis that it allows for cases to be chosen that are likely to replicate or extend the emerging theory (Eisenhardt, 1989).

Only projects that had been completed and were fully operational or had totally failed were eligible for inclusion to enable the researcher to evaluate subsequent performance. Geographically case studies were restricted to South Africa, Mozambique and Zimbabwe representing a nesting of case studies in the SADC. As a result, the case studies cover the period from 1994 to 2012. In addition, a minimum transaction threshold of US$ 130 million was applied. This enabled a focus on those transactions that are of sufficient scale and impact, so as to be transformational for the communities and areas in which they were executed. Table 3.3 lists the seven case studies selected with comprehensive accounts of each project in chapter four.

Table 3.3: Case Study Listing

	Case Name
Primary Cases	Seacom Undersea Cable
	Gautrain Rapid Rail Link
	Kalkbult Solar Park
	Pebble Bed Modular Reactor
	Mozal Aluminium Smelter
	Sasol Natural Gas Project
	Chisumbanje Ethanol Plant

3.5 Case Construction and Data Analysis and Interpretation

A sequential and exploratory approach in the drafting of each of each case study was followed. This is shown in Figure 3-1 below and elaborated on in the descriptive text that follows.

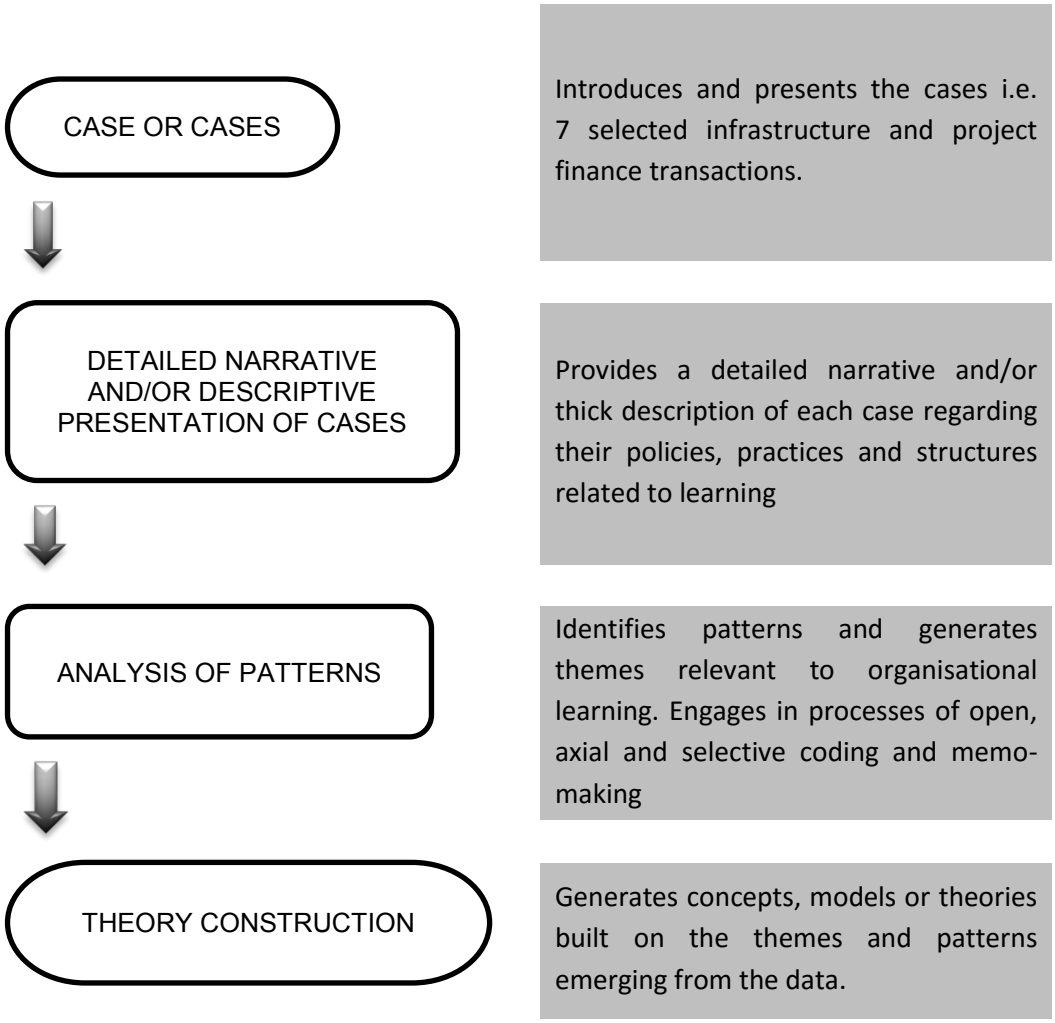


Figure 3-1: Case Study Execution (Rule and John, 2011)

The exploratory approach was adopted on account of the fact that the qualitative research questions posed included 'why' and 'what' questions that prompted subjective responses from respondents. It was anticipated from the beginning that some of the insights from the case studies would not be extracted from hard data and metrics, but human behavioural patterns and motivations, ideally suitable for an exploratory approach. In a number of case studies more than a decade had passed since the project was commissioned and the research was undertaken that allowed an

exploration of the project dynamics at commencement, and how these dynamics evolved with the passage of time.

For each case constructed a sectoral contextualisation of the project was performed within both an international and country specific setting. This background allowed each project to be analysed taking into account global developments in the respective sector, and the country specific factors that informed the project's conceptualisation.

The project setting was then followed by a collation of objective data including numerical and descriptive inputs. This data was sourced from multiple sources that included audited annual reports, legal and contractual documentation, reputable industry journals, academic papers, the financial press, environmental impact and management documents, regulatory documentation, World Bank and International Finance Corporation databases, websites of related companies and bodies, published text books, and the Bloomberg data monitor. A large portion of the academic literature elaborated on the public policy, international relations, negotiation, international trade, human rights, politics, ethical, technical, and moral dimensions of the cases. While not addressing the core focus of this thesis, these contributions were rich in extracting quantitative and technical data. This information collation allowed the researcher to gather core objective data on each transaction including the deal size, project specifications, key legal arrangements, and sustainability imperatives. By using multiple sources, the veracity of the data was interrogated and accurate information compiled. The data collation exercise further gave insight into the major issues relating to each case, some of the significant challenges that were encountered, and measures implemented to address these. It also prompted numerous project specific questions that were qualitative in nature and were incorporated into the interview process.

An analysis of the data obtained was then conducted with interpretations of the decisions made by the project stakeholders, and their motivations in coming to these decisions. This was particularly effective where credible information sources such as annual financial statements and original legal agreements were the source, and yielded information on a case over an extended time frame. The interpretation was comprehensively documented and cross-referenced to the objective data for veracity and reliability.

The next stage of the research involved selecting different and independent practitioners involved in the project for semi-structured

interviews. Practitioners were selected because of their knowledge of particular parts of the project, and by interviewing commercial bank representatives, regulators, development finance institutions, sponsors, legal practitioners, sustainability officers, and other stakeholders, the author was able to obtain a holistic view of each case, with respondents having different motives and imperatives on the same project. A total of 40 semi-structured interviews were conducted with 7 of these interviews applicable to more than one case study. The specific identity of each respondent was purposefully with held in the thesis but the supervisor and examiner were furnished with these details. An interview protocol was applied to each case as elaborated on in Table 3.4.

Table 3.4: Case Study Execution (Davis 2003)

	Author's Project Finance Interview Protocol
1.	Description of project, including type, location, size and other specifications
2.	Reason for project and sponsors' needs
3.	How project participants were assembled
4.	Legal structure of project entity, including a diagram of project structure
5.	Analysis of project risks and economic viability
6.	Most important project contracts and principal provisions
7.	Alternative sources of finance considered
8.	Structure of financing
9.	Pricing, maturity and other financing terms, including guarantees and other third-party sources of support; insurance, collateral, and other forms of protection; and important features of financing documentation
10.	Credit analysis from the investors' and lenders' perspectives
11.	Principal problems encountered with project and financing
12.	Investors' and lenders' concerns before and since
13.	Most innovative features of the project
14.	Most important lessons learned
15.	How the project illustrates current regional and country trends

In a semi-structured interview process, probing questions relating to qualitative aspects of each case were posed, followed up on, and confirmed. In this respect the data collation performed earlier meant that there were rarely differences regarding the objective attributes of a case e.g. deal size, and the questions could focus on the 'why' regarding the project arrangements, and solicit insight as to the reason for arranging the transaction in the manner that it was. Respondents were also examined as to how they would alter the arrangements in each project with the benefit of hindsight, and how they forecast future projects evolving.

The interviews were held in person and recorded electronically. On completion each recorded interview was professionally transcribed. A few exceptions were noted including four respondents in Cape Town, Maputo,

and Harare where the interviews were conducted telephonically. In addition, two of the interviews conducted in Zimbabwe relating to the Chisumbanje Ethanol plant were recorded by way of note taking on account of the heightened sensitivity relating to the project, and to address identification and privacy concerns of respondents. One interview on the Gautrain Rapid Rail Link had a combination of written and audio recorded record taking. When all the interviews for each respective case had been completed they were printed out and analysed. Thematic features across interviews were identified and drafted for each case study. The case studies collated responses to the semi-structured interviews, and integrated these insights with the data collated on each case prior to the interviews having taken place. To capture both the letter and spirit of the respondent contributions, the cases weave together in a coherent manner the responses of interviewees, making detailed use of their actual terminology in quotations and interpreting these contributions in the overarching project context. Each case study concludes by summarising the lessons, insights, and replicable considerations.

3.6 Validity and Reliability

The reliability and validity of data is critical in ensuring the veracity of the research. Internal validity in the cases and throughout the research assignment was achieved by the incorporation of multiple interview sources and perspectives. These interviews were prefaced by the extensive use of hard data sources such as audited annual financial statements detailed below.

Construct validity was achieved by selecting the key focus of the research effort in advance. Specifically, the research focused on the capital structure, governance/legal arrangements, risk management, and sustainability arrangements of each case study. The construct validity was embedded by way of an interview protocol illustrated in Table 3.4 that directed and channelled the research effort into the four main considerations noted above. A clear chain of evidence based on pre-interview data collated and respondent interview data was then constructed and drafted into individual case studies allowing the reader to follow how the researcher progressed from the original research questions to the final conclusions (Yin 1994). A multi-layered form of triangulation was then applied to ensure the internal validity of data and consistency on terms of the data collated and the conclusions arrived at.

Figure 3.2 below illustrates a framework for achieving methodological rigour in case studies embedded in four primary constructs. These are the

internal validity, construct validity, external validity and reliability. External validity for inductive and exploratory case studies requires that the research findings can be generally applied to other similar cases. Due to the fact that theoretical sampling techniques are applied extensively in the selection of case studies, this does not allow for the statistically representative conclusions to be arrived at. Yin (1994) argues that case studies can however result in analytical generalisations that are applicable to other settings based on the conversion of empirical observations to theory. The thesis specifically differentiated between empirical observations that were specific to each case and those that had more general application. Each case study concludes with a 'Learning Summary' unique to the respective project. The thesis then extracts the general conclusions from all the cases and captures these into a model that can be applied beyond the collection of cases collated. Reliability concerns were addressed by a structured and detailed methodology for collating evidence. All external reports and documents were filed per each case study for easy access and retrieval. This database included applicable case study notes, plans, and changes in approach. In addition, a case study protocol was applied to ensure consistency in thematic approach, focus and content across the seven case studies. These measures allow for transparency in how the case study was compiled and provide a database where empirical data can be retrieved.

Broadly speaking two sets of data were obtained. The first set relates to 'hard data'. This data consists of hard statistical attributes of each project including the deal size, sponsors, investors, debt/equity ratios and fundamental deal attributes. Much of this data was accessible from audited annual reports, legal and contractual documentation, reputable industry journals, academic papers, the financial press, environmental impact and management documents, regulatory documentation, World Bank and International Finance Corporation databases, websites of related companies and bodies, published text books, and the Bloomberg data monitor.

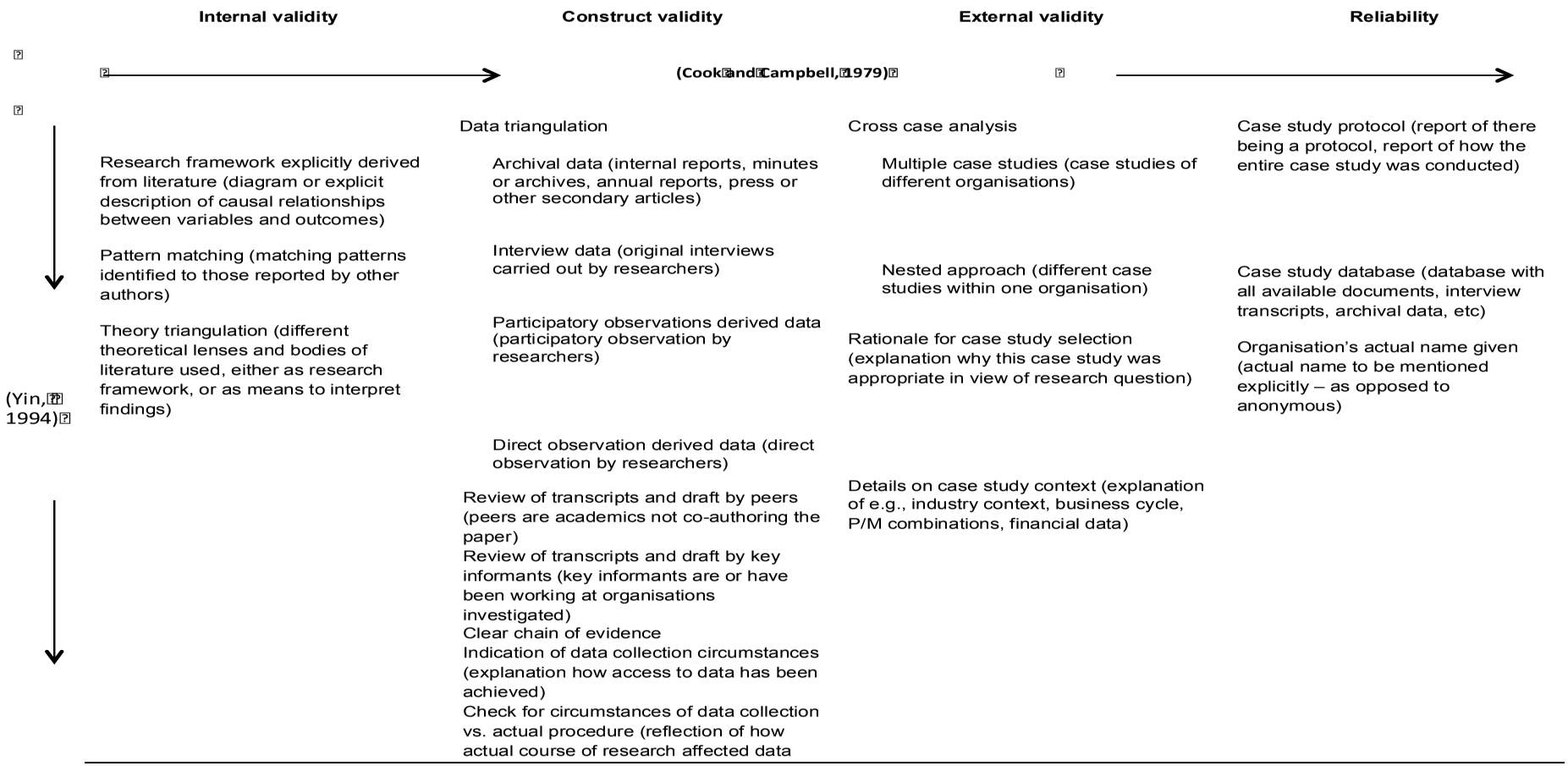


Figure 3-2: Framework for an Investigation of the Methodological Rigor of Case Studies (Gibbert et al., 2008)

On case studies that had been funded using public funds e.g. Gautrain and the Pebble Bed Modular Reactor, a rich vein of data was already in the public domain due to South African statutory prescriptions on access to public finance information. These statutory sources included audited annual financial statements and reports, public consultation processes, and funding allocations from the national treasury. The hard data was then corroborated by different stakeholders as part of the interview sessions.

The qualitative data aspects were largely extracted by way of the semi-structured interview process. A detailed process of researching and collating information on each case study was conducted prior to the interview sessions. During the interview sessions the researcher assessed responses to identify discrepancies and alignments where applicable between the preliminary research and the respondent feedback. These inputs were cross-referenced and analysed for consistency, and where required, follow up enquiries were conducted to remedy matters that were factually divergent. The probing interviews also prompted qualitative insights from respondents, and encouraged participants to identify and rank qualitative observations.

This multi layered method of triangulation involving objective external data, and key inputs of stakeholders that were party to each transaction ensured the validity, accuracy and completeness of the data. Figure 3-2 illustrates this process of triangulation. The ‘source’ triangle addresses the multiple sources of objective and qualitative data gathered above in the form of documentary and specialist practitioner inputs. The ‘method’ triangle exemplifies how the interview process was complemented by the accessing and extraction of pertinent data, using relevant information repositories.

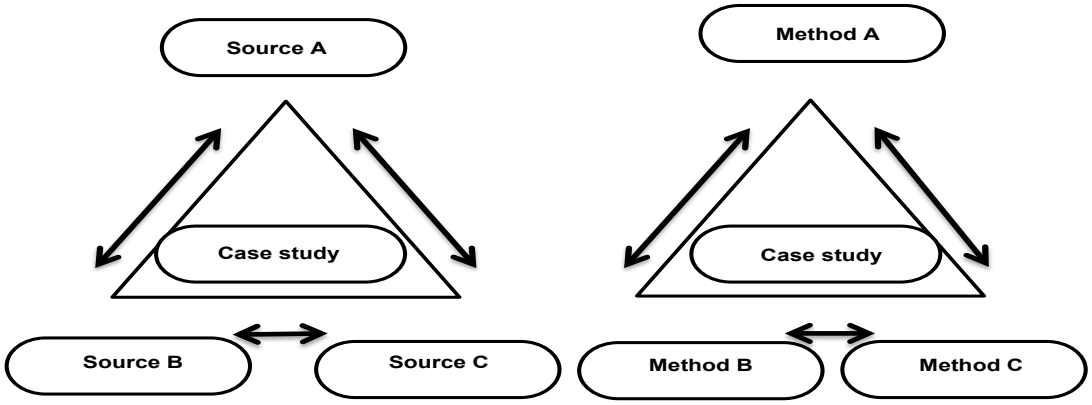


Figure 3-3: Forms of Triangulation in Case Study Research (Rule and Hohn, 2011)

3.7 Limitations to Study

The biggest limitation to this study is that the cases selected represent only three countries in Sub-Saharan Africa. They are extremely valuable in the formulation of a qualitative theory for Southern Africa. However, their applicability in East, West, and Central Africa is by inference, and derived from the fact that many countries in Sub-Saharan Africa share a range of similar and overlapping socio-economic and development indicators. The second limitation is that the study covers projects that span a period from 1994 to 2012. This limited historical record of project finance in the selected countries is largely attributable to political instability including civil wars and economic sanctions that have limited the number of legacy infrastructure and project finance ventures. Furthermore, the case studies were conducted during a specific window period in 2014/2015 and details of the evolution of each project from conceptualisation to date are potentially diluted due to the passage of time. The academic literature contains varied definitions of project success and failure. Practitioners appear to agree that key considerations of success hinge upon whether the project is completed within budget, once commissioned operates in accordance with its engineering and design specifications, and whether the project commissioned within the time frame set. Flyvbjerg (2014) highlights the challenges in large-scale projects across the globe noting that nine out of ten incur cost overruns in excess of 50%, projects regularly achieve shortfalls in promised benefits of 50%, and timely completion is a rare and exceptional occurrence. This definition of success by Flyvbjerg (2014) may be inadequate in capturing qualitative arrangements such as socio-economic and the environmental impact of a project. A final limitation for consideration is that project finance stakeholders often have information that they consider proprietary in nature. As a result, such knowledge may not be disclosed in the probing interviews, thinning some of the potential insights.

4 The Case Studies

This chapter captures details pertaining to the 7 case studies that are the basis of the thesis. Four of the cases are located in South Africa, two in Mozambique, and one in Zimbabwe. The cases are clustered according to their countries of origin. Each case is introduced by way of a 'Fact Sheet' that captures the key details of the project. This includes the project description and details of the developers, EPC and related contractors, sources of capital, key shareholders, and the project objective.

Each case is then documented utilising information obtained from interviewees, financial statements, corporate documentation, and related reports as explained in the methodology in chapter 2. The information is organised in the following format to enable a coherent collation. A brief background of each case is given, followed by an examination of the financial structure, including ownership and how the financing for the project was arranged. A consideration is made of the key risks relating to the project and how these were mitigated in the project arrangements. The governance, institutional, and legal arrangements pertaining to the project are identified and considered in enabling the project to proceed. Each case then concludes with a summary of the lessons learned.

After each cluster of cases in South Africa and Mozambique a country cluster comparison is performed whereby key common attributes within each case are compared, highlighting in-country differences and similarities, and capturing key developments subsequent to project commissioning such as refinancing, brownfields expansions, and changes in the risk environment.

South Africa Cluster

4.1 The Seacom Undersea Cable

FACT SHEET (Seacom, 2014)	
Project Description	▪ 1.28 TB high capacity submarine fiber optic cable system ▪ Linking Africa and Asia to Europe via the Middle East ▪ Total route of 17 000 km with the undersea portion exceeding 13 500 km ▪ Majority African ownership of project
Key Personnel	▪ Brian Herlihy – CEO ▪ Jean-Louis Parmentier – COO ▪ Craig Wilson – CFO ▪ Christophe Albert – Construction Manager ▪ Greg Meneses – General Counsel
Contractors	▪ Tyco Telecommunications – construction ▪ Tata Communications Transformation Services – outsource network administration, operations and maintenance
Objectives	▪ Deliver infrastructure support for the growth of the ICT sector, in particular Business Process Outsourcing, call centers, pharmaceutical research industries and education networks ▪ Complement GSM and fixed line national carriers ▪ Facilitate the development of high volume, low cost market encouraging industries to emerge, stimulating further demand ▪ Enhance greater regional co-operation ▪ Structured to align to the spirit of NEPAD, the Kigali protocol and the policy objectives of governments ▪ Committed to principles of open and equitable access to broadband
Funding and Shareholders	▪ Fully funded (November 2007) – US$ 300 million (Total project value US$ 600 million) ▪ Project debt provided by Nedbank Capital and Investec Bank ▪ 76.25% African owned. Remaining 23.75% is held by Herakles Telecom LLC (Project developers) ▪ African equity portion made up as follows: ➢ Industrial Promotion Services (26.25%), an arm of the Aga Khan Fund for Economic Development ➢ Venfin Limited (subsequently Remgro) (25%) ➢ Convergence Partners (12.5%) ➢ Shanduka/ Sanlam Private Equity (12.5%)
Products and Services	▪ Open access to all service providers with capacity provided on protected Synchronous Digital Hierarchy (SDH) transmission electronics ▪ Connecting to PoPs anywhere in the world through partnership relationships ▪ Customised solutions including internet and global onward connectivity for voice and private line services ▪ Backhaul solutions to Nairobi, Kampala, Kigali and Johannesburg. Working with landlocked countries to ensure that inland networks are built ▪ SEACOM offers two types of services: ➢ Indefeasible Rights of Use (IRU) – Bandwidth ownership for the life of the cable ➢ International Private Leased Circuit (IPLC) – Short term needs for bandwidth (< 5 years) ▪ Number of employees: 110 (2014)

4.1.1 Background

Access to international fiber optic connectivity has historically been characterised by entrenched developed and developing world disparities. In 2007, 32 of the world's 53 poorest countries had no access to international fiber optic connectivity representing an unserved population of 461 million. This gap in connectivity was attributable to the lack of economic viability in setting up undersea cables to service these markets. As a result satellites serviced many African countries international telecommunications requirements. Some of the drawbacks of the satellite offering included the low bandwidth capacity, and extremely high unit costs that resulted in usage being largely restricted to voice traffic originating from fixed line networks (Ruddy, 2007).

Three factors have coalesced to enable investment in economically viable sub-marine cables in the late 1990's and early 2000's. The first was the explosive growth of mobile telephony and internet usage in Africa. As of the end of 2011 Africa had almost 650 million active mobile telephone accounts. Average mobile telephony growth rates of 41% in Africa are surpassed only by those of 67% in South Asia (Yonazi et al, 2012). The other two factors are the emergence of increased investor appetite on the African continent, coupled with the greater access to capital this implies. Investment in fiber optic cables on the continent was estimated at US$ 953 million between 1988 and 2008. The comparative figure for the period spanning 2009 to 2012 is US$ 2.9 billion (Terabit Consulting, 2013). Challenges however still remain including connecting landlocked countries with a comprehensive and cost effective terrestrial back haul network. Seacom was the first undersea fiber optic cable connecting Southern and Eastern Africa to Europe and Asia. The cable has a 1.28 Tb/s capacity and runs for 17 000 kilometres (13 500 kilometres being the undersea portion) from Mtunzini in South Africa and progresses to Mozambique, Madagascar, Tanzania, Kenya and Djibouti linking to India, the Middle East and Europe. Seacom is an open access platform offering data and voice global connectivity solutions aimed at linking businesses, individuals and communities. Its independence is underlined by the fact that the project company and its sponsors are not telecommunications providers.

4.1.2 Financial structure

Ownership structure

The ownership structure of Seacom is made up of 5 investors. The promoter, project developer, and conceptualiser of Seacom, is New York

based Herakles Telecom LLC (Herakles) with a 25% stake. Herakles has extensive expertise in the development of international infrastructure, technical expertise, and project finance and in emerging markets, and is the only non-African shareholder. A second tranche of investors is made up of South African private equity and investment firms, namely, Convergence Partners (12.5%), Remgro (25%) and Shanduka and Sanlam Private Equity with a joint stake of 12.5%. To varying degrees these companies have exposure and/or expertise in the telecommunications sector. The final investor is Industrial Promotion Services (26.25%), which is an international development agency that has invested in over 50 industrial project companies in Africa and Asia. One of the fundamental principles in the conceptualisation of Seacom was that it be Africa owned. In this respect more than 76% of the shares are held by African entities.

A key feature of the Seacom project is its conceptualisation as an independently owned private initiative. This was in contrast to the dominant carrier led consortiums in the sector. The private initiative arrangement came with a number of advantages. Firstly, a consortium arrangement generally has more participants involved. Whilst this usually means the capital contribution required of each party is reduced, it also dilutes profit/dividend distributions. A consortium arrangement may also slow down the decision making process due to the number of players involved. Assuming 10 representatives in a consortium arrangement, “you get ten people sitting around a table…you’ve got to get them to make decisions, you’ve got to run through ten different EXCO’s and Boards to get a decision”. Compounding slower decision making in a consortium arrangement are the administrative and logistical costs to enable the consortium to interact and function optimally. As consortiums are often multi-national in their constitution “you have to fly them to that table” and fund all the logistical matters related to these interactions. The downside to the fewer participants in a private initiative is the elevated risk exposure due to each party contributing comparatively more capital. The benefits of overall coherence and enhanced capacity to effectively and efficiently co-ordinate the project exceed the elevated risk exposure.

How the financing was arranged

The Seacom project faced a number of hurdles in raising the requisite capital. The immediate challenge was the ‘first dollar’ dilemma that describes a scenario where potential capital providers refrain from committing the first capita tranche as they are waiting for other investors to

first commit capital, and signal the viability of the project. Seacom also encountered investor hesitance after the bursting of the dot com bubble in 2001, the perceived higher risks of investing in sub-Saharan Africa, and the complexity of the project which required the co-operation and participation of at least 9 African states and 5 international partner nations. Significantly, an important part of the business case was that Seacom would be first to market, and this required capital to be raised speedily.

Financial closure on the project was also threatened by the escalation of the international financial crisis towards the end of 2007. This resulted in credit markets becoming progressively less liquid. A European hedge fund that had been envisaged to take up a significant equity stake was unable to make good on its commitment resulting in the African equity ownership increasing from 50% to 76% when a replacement investor was found. An interviewee confided that the Seacom project team was "lucky in that they managed to get this away before the crisis had really impacted lenders". If the team had moved slowly and "done the deal six months later, the margins would have been much higher" or debt funding simply unavailable. The project company also managed to secure more competitive pre-crisis floating LIBOR rates. The unhedged interest rate exposure benefited from the decline in LIBOR as a result of the subsequent quantative easing.

Whilst the cost of the overall project was US$ 600 million the project developers and sponsors were innovative in reducing the capital injection. Firstly, by entering into co-build arrangements on specific sections of the cable including the Africa to India and Middle East to Europe legs, the actual capital outflow from Seacom was restricted to US$ 300 million. The project company also made extensive use of Indefeasible Rights of Use (IRU) to raise capital upfront. IRUs are simply a mechanism where wholesale buyers of data pay an up front fee entitling them to specified data capacity on the cable, generally spanning a period of 15 to 20 years. Capital raised from IRUs to fund the project construction amounted to almost US$ 160 million IRU agreements. Wholesale subscribers contributions therefore had a significant influence on the leverage. The debt to equity ratio for Seacom was an unorthodox 25% debt and 75% equity. At the commencement of construction the IRU commitments amounted to more than 1.25 times the total debt funding, significantly reducing the credit risk exposure of South African banks Nedbank and Investec who were the debt capital providers. From a banker's perspective the IRU's were critical and significantly de-risked the project as "it [IRUs] was absolutely vital and it was I would say the single biggest factor that

allowed us to get the deal" done. In addition to being an important source of construction capital the IRU's mitigated the naked revenue risk that frequently compromise capital raising in project and infrastructure finance ventures.

The 25%:75% debt to equity ratio may paint a somewhat incomplete picture because some of the investors had back leveraged structures on their equity contributions. Back leveraged structures occur where a sponsor funds a portion of equity contributions to a project using debt. This debt is reflected in the sponsor's balance sheet but not in the project company, where the inflow is shown as a pure equity injection. The use of back leveraged structures has the effect of understating the degree of debt used to fund a project if only the balance sheet of the project company is analysed. If the leverage taken by a number of investors on their own balance sheets is included this would likely result in a debt to equity ratio of 50%:50%. While this is still moderate by project finance standards it reveals significantly higher levels of overall gearing. The back leveraged structures have had a number of negative effects for Seacom. Firstly, it has led to a situation where distributions are "pre-coded into the shareholders agreement [and that] there would be significant dividend flows right from the start". This has contaminated the medium to long-term decision making with a tension arising between dividend payments and reinvestment of funds in future growth strategies.

It is also notable that Herakles as project founders and promoters received a proportion of shares block in the project company as a free carry as compensation for having shaped and conceptualised the opportunity, and the costs and risk of losses if the project had failed to materialise. A final consideration in the conservative capital structure arrangements related to the fact that it is not possible to insure an undersea cable. By retaining significant capital reserves Seacom in effect self-insured its infrastructure and created another layer of protection for unexpected occurrences. Following the completion of the construction phase and the operationalization of the project company, Seacom set out to restructure its capital structure in the period 2009/2010. The aim was to increase the debt levels to US$ 150 million of the total US$ 300 million capital requirement, thus achieving a debt to equity ratio of 50%:50%. The Seacom project also has a natural hedge against foreign exchange risk with 95% of its income streams denominated in US dollars.

Post construction financial overview

As a private and unlisted entity Seacom is not legally compelled to disclose its annual financial statements. However, key profitability and valuation metrics have been obtained by way of a review of the financial statements of one of its listed sponsors, namely Remgro. Remgro complies with International Accounting Standards (IAS) and as such equity accounts for the 25% investment in Seacom in accordance with International Financial Reporting Standards (IFRS) 10 on Consolidated Financial Statements. Key financial metrics on Seacom obtained from these audited accounts are as follows:

Table 4.1: Remgro Limited - Seacom Financial Metric Extrapolation (Remgro Annual Financial Statements, 2009 – 2014)

Year	Headline Earnings	Dividend	Intrinsic Valuation	Book Value
2014	(R 26)	R 324	R 3964	R 2 276
2013	R 0	R 400	R 4 276	R 2 468
2012	(R 108)	R 380	R 3 704	R 2 344
2011	(R 204)[2]	R 0	R 4 227	R 2 308
2010	R 0	R 0	R 4 480	R 2 884
2009[3]	R 0	R 0	R 4 480	R 2 884

(All amounts have been grossed up to reflect a 100% stake as opposed to Remgro's 25% ownership)

Based on the extrapolated financial metric above the Seacom cable is yet to achieve accounting profitability. Operational losses in 2011 and 2012 have been addressed resulting in the entity breaking even in the 2013 fiscal year. Despite the accounting losses, Seacom is generating positive cash flows. As a result cumulative dividends distributed to equity shareholders amount to R 780 million from its inception till 2013 with an additional R324 million distributed in the 2014 financial year.

From a reporting perspective the IRU's have caused somewhat of a paradoxical reporting picture. Profits for the project company in accordance with IFRS have been small and occasionally negative. This has been the case because cash receipts on 15 to 20 year IRU's are amortised and released to the income statement over the duration of the leases. Cash inflows to the project company were however large and lumpy and were received shortly after the signing of each IRU lease agreement. Due to these large cash inflows enjoyed upfront the shareholders have distributed significant dividends amounting to

[2] Fifteen months ended 30 June 2011.

[3] Acquisition of Venfin and effective 25% stake in Seacom.

approximately R1.1 billion since 2009, despite cumulative losses amounting to R 338 million over the same period.

4.1.3 Key risks

Regulatory and environmental

The key regulatory and environmental risks related to navigating the telecommunications, environmental, and taxation regulatory arrangements in 11 countries. In a number of these countries on the African continent, regulations and legislation explicitly governing undersea cables did not exist. Socio-political issues regarding the location of landing stations and the route that the cable would take had to be addressed.

The role of the principal promoter Brian Herlihy in the overall success of the project is essential to understand. Herlihy had been actively involved in the conceptualisation of the Africa One undersea cable that failed to reach commercial fruition. His knowledge of the sector coupled with his relationship development amongst the multitude of stakeholders was critical to the project's success. Herlihy was "able to message this project at the right levels, within governments of the East African countries in which we were looking to land". In addition he demonstrated an ability to "win over the hearts and minds of people as to what this project was going to do [and] how meaningful an impact it could have". The ability to engage ethically and successfully with governments and regulators in part stemmed from the willingness to share credit for the venture. In summing up the role played by Herlihy one interviewee concluded, "without him in fact this project would never have happened…and if he had handed over after the ideas phase, it would have collapsed". Seacom's majority African shareholding further enhanced its credibility and appeal to key decision makers in the political and regulatory space.

The growth in volumes and ability to provide a seamless service has been set back by bottlenecks in the terrestrial backhaul network, particularly in landlocked countries. A number of countries on the continent have not yet fully liberalised their cable sectors, curtailing the ability of Seacom to sell capacity to end users. In Tanzania for example long haul fiber is limited to the state owned operator TTCL, whose margin results in very high costs for end users. In Kenya a lack of mandatory minimum standards in the quality of inland fiber cables has resulted in erratic performance and compromised the volume of sales. Seacom faces the difficult choice of building its own inland fiber network, collaborating with existing providers to improve reliability and pricing, or simply swapping undersea capacity for

backhaul capacity. The dominance of frequently state owned incumbent telephone operators in the final loop, has also constrained distribution and sales growth. Operators such as Telkom in South Africa and TTCL in Tanzania have historically owned much of the existing fiber, are favoured by state regulatory authorities, and actively seek to retain their dominance as incumbents. These players initially perceived Seacom to be a direct competitor and sought to curtail its access to end users. From a sustainability and environmental perspective, the cable had to be laid with minimum disruption to surrounding fauna, flora, and related commercial activities and in accordance with the Equator Principles. This was a relatively predictable process owing to the limited environmental impact of undersea cables. Key features included environmental impact assessments, plans, and engagement with stakeholders and affected parties to select the least disruptive options.

Competition and incumbent operators

While the Seacom cable would be the first to market in Southern and East Africa, it was not anticipated to enjoy a monopoly position for an extended period of time. The WACS and EASSY cables were being developed concurrently and expected to launch within less than 24 months after Seacom. An aggressive and disruptive strategy was purposefully adopted and on entering the market bandwidth prices fell between 80% and 90% in the first year. Over the life of the project company prices have declined approximately 50% per annum with 2013/14 deflation ranging between 20% to 35%. Seacom has participated in vigorous price declines on the premise that there is still significant pent up demand. Growth in volumes has been more than adequate to ensure sustained revenue. Technological advances increasing cable capacity from 10 to 100 gigabytes per wavelength of light have also worked in Seacom's favour. Seacom's launch was successful in breaking the deadlock of operator owned infrastructure and introducing competition based on quality of service, price points, and the provision of value added services.

Construction and technology

The Seacom undersea cable was commissioned as a turnkey project and largely fulfilled the budgetary, timing, and performance specifications prescribed in the original contract. Tyco was selected via a tendering process to be the key service providers in the manufacture and deployment of the undersea cable. The technology Seacom was deploying was tried, tested, and successful in other parts of the world. Prior to the commencement of construction activities, it emerged that one of the

companies in the Tyco Group faced the prospect of bankruptcy. Concerned that this development could contaminate other parts of Tyco, and represent a counterparty risk in terms of Tyco's capacity to deliver on its contractual obligations, the project company management undertook extensive research and sought legal opinion that concluded its the Tyco with which the project company was dealing was ring-fenced and its contractual obligations would be fulfilled.

Credit

As highlighted in the section on the arranging of finance credit risk was addressed in the main by way of a very conservative debt to equity ratio of 25%:75%, and extensive use of IRUs with creditworthy off-takers. One disadvantage of the IRUs was that they obfuscated transparency regarding annuity income resulting in the debt providers raising the concern of "certainty versus longevity" of revenue. The nature of an undersea cable is that it has a very low secondary value as a liquidated asset. Seacom also did not enjoy any guarantees from participating countries. Seacom has responded by intentionally blending into the revenue stream shorter dated and renewable leases. Subsequent to launch revolving facilities of 3 and 5 year durations were entered into with Investec and Nedbank to ameliorate these working capital concerns. The Investec facility was never utilised, and in 2012 the total outstanding debt was refinanced by way of an open tender won by Nedbank. The refinancing revealed the different goals of debt providers. Nedbank sought to build a sizeable long dated infrastructure book generating steady interest returns, and supplemented by fees and commissions. The Investec approach was to earn higher interest, fees, and commission during the riskiest phase of the project, specifically construction. Subsequently Investec was content to retire its exposure and had limited desire to build a long dated infrastructure funding portfolio.

Political and piracy

In 2009 the proliferating piracy off the coast of Somalia resulted in a delay of one month in the laying of portions of the Seacom cable. The path that the cable was to traverse included waters where pirates had been active and had taken a number of vessels and their crews captive. The matter was resolved by commissioning a gun ship to accompany the vessel laying the cable with an overrun of between US$ 1 and US$ 2 million dollars. The Seacom project was compromised by political developments in North Africa and the Middle East as a result of the Arab Spring in

January 2011. The project company was delayed in placing its fiber routes across Egypt and igniting its T North Cable because the Egyptian government sought to curtail protestors use of social media by cutting off internet access. This leg of the cable was essential to Seacom as it connected the rest of the line to the crucial European market. In response Seacom rerouted traffic by buying bandwidth capacity from India to Europe at a cost in excess of US$ 1 million per month. This situation lasted for almost four years resulting in a cost overrun of US$ 60 million and changed the economics of the project significantly. These concerns were mitigated by the quality of a highly engaged and strong project management team and investors. A banker interviewee complemented the project management team noting the importance of being kept appraised of adverse developments and plans to resolve them. In addition, the project developers structured a contingency provision to draw down on in the event of unanticipated developments.

4.1.4 Institutional and legal arrangements

Principal contracts

The shareholder agreement had to be particularly strong in part due to participants having different funding arrangements and the need for clarity and certainty on matters such as the dividend policy. All shareholders are represented in the governing structures in one form or another to ensure minority protection. These include the Board, audit and risk committee, and remuneration committee. The most intensive debates between shareholders have been centred on commercial matters such as where Seacom goes in terms of strategy and around reinvestment versus distributions of capital. The shareholder agreement also codifies an explicit ethical code prohibiting unacceptable business practices. The Seacom project company has no majority shareholder that has had the occasional effect of prolonging decision making. The manufacturing and laying of the cable was executed via a turnkey contract. The timing of this contract was fortuitous for Seacom as the equipment and service providers in this sector were suffering very low demand on account of the overinvestment in undersea cables in western markets during the dot com era. Capacity was plentiful, and rates extremely competitive. The final important set of contractual arrangements related to the fleet of IRU's signed. These were critical a source of construction capital, enabled the derisking of the project for debt capital providers, and demonstrated market demand. The multi-national and private nature of the project, and the fact that most of the cable is in international waters meant that no single overarching

concession was required and regulatory permission was sought from participating countries for landing points.

4.1.5 Lessons learned

The Seacom project provides a number of key lessons. The first is that the strength and the credibility of the project developer are key in getting from concept to financial closure. The strength, experience and continuity in the project team from developing the concept, raising the capital and getting the necessary approvals, to final launch and operational status is another key insight. Interviewees also highlighted the different mind-set required in developing and running a project. The ability for project developers to move quickly and decisively in taking advantage of a window of opportunity is demonstrated in this project. This agility can be significantly attributed to the private arrangements of the sponsors, as opposed to the more common consortium and carrier led arrangements. Having no direct government sponsors on the project also resulted in less political and related delays. A 12 to 24 month delay would likely have compromised the project's financial closure and the underlying business case on account of other competitors who entered the same market. Despite the narrow window of opportunity, the Seacom project was premised on a long-term business case, informed by a positive outlook on economic growth prospects for the continent, and a concomitant increase in demand for data. The ability of the project team and the principal promoter to engage with multiple stakeholders across many countries in a pro-active, win-win ethos, without engaging in corrupt or unacceptable business practices is exemplary. Importantly this engagement was enabled by having access to decision makers as a result of getting credible and effective local partners across the partner countries. Regarding reaching financial closure the project re-enforced the importance of a sound financial structure and business plan, early equity investment enabling subsequent debt raising, and ensuring project documentation is strong and comprehensive.

4.2 The Gautrain Rapid Rail Link

FACT SHEET	
Project Description	▪ 80 kilometre rapid rail system ▪ 15 kilometres subterranean ▪ Johannesburg, Tshwane (Pretoria), and Ekhuruleni Metropolitan Municipalities ▪ Total number of stations 10 ▪ Province of Gauteng is owner of project
Key Personnel of Gauteng Management Agency	▪ Jack Van der Merwe – CEO ▪ William Dachs - COO ▪ Able Mawela – Chairman ▪ Ismail Vadi – Executive Authority – Member of the Executive Council for Transport: Gauteng Province ▪ Ian Scott – CFO ▪ Warburton Attorneys – General Counsel
Contractors	▪ Bombela Consortium Company made up of: ➢ Murray and Roberts – Civil works and stations ➢ Bouygues – Civil works and stations ➢ Bombardier Transportation – Electrical and mechanical systems including rolling stock ➢ Strategic Partners Group – Black Economic Empowerment Group ▪ Arup – Independent Certifier
Objectives	▪ Improve transport mobility and urban efficiency ▪ Uplift Johannesburg and Tshwane business districts ▪ Stimulate economic growth, investment, new development, job creation, and tourism ▪ Environmental sustainability ▪ Human capital development and capacity building in multi-faceted infrastructure projects ▪ Showcase South Africa as a progressive and modern African state ▪ Demonstrate government's commitment to public transport ▪ Advance small and medium sized businesses ▪ Promote Black Economic Empowerment ▪ Facilitate the hosting of FIFA 2010 World Cup (emergent objective)
Funding and Shareholders	▪ National Government via the Department of Transport and Division of Revenue Act – 44.2% ▪ Gauteng Provincial Government Budget Allocation- 26.1% ▪ Gauteng Provincial Government Borrowing – 18.4% ▪ Private Sector Equity – 1.8% ▪ Private Sector Borrowing – 9.5% ▪ Overall project cost circa R 30 billion
Products and Services	▪ Accessible, efficient and effective rapid rail transit system on designated routes ▪ Reliability, safety and security paramount ▪ Frequency of service 10 to 30 minutes ▪ Operating hours 05:30 to 20:30 ▪ An extensive feeder and distribution bus network complementing the rapid rail link

4.2.1 Background

The Gautrain Rapid Rail Link ('Gautrain') is South Africa's and Africa's first high-speed metropolitan rail network servicing key nodes in South Africa's commercial and provincial hub of Gauteng Province. The province of Gauteng is the smallest of South Africa's 9 provinces covering an area of 17 010 square kilometres or approximately 1.4% of the country's land mass. It has a population of 11.2 million people accounting for 22.4% of the total South African population, has a population density of 658 people per square kilometre. Despite its relatively small geographic size Gauteng Province is responsible for almost 34% of the countries gross domestic product, and 10% of the entire African continent's gross domestic product (Gauteng Provincial Government, 2014). Within Gauteng reside the Johannesburg, Tshwane and Ekhuruleni Metropolitan Municipalities that host the country's commercial capital, political capital. Approximately 60% to 70% of Gauteng's population is dependent on public transport. The primary mode of public transport is the privately owned and informal mini bus operators known locally as "taxis" (Van der Westhuizen, 2008). The province hosts 38% of all registered vehicles, 41% of minibus taxis, and enjoys more than 50% of national rail and bus subsidies (Van der Merwe et al, 2001). Metro rail services in the province are facilitated by the Passenger Rail Agency of South Africa (Prasa).

Proposals on the Gautrain began in the mid-1990s after South Africa's first democratic elections. The Gauteng provincial government sought to identify at a pre-feasibility stage a number of concepts that would act as an economic stimulus to the province. Ten projects were identified under a provincial entity called Blue IQ including the Gautrain. Gauteng province faced significant changes in its economic base and proponents believed that "the province definitely needed a redefining economic impact through a big infrastructure project". The mining sector that had formed the foundation of the province's economy was in rapid decline, together with major portions of the industrial hubs such as those in the East Rand. The province was also hampered by poor spatial development planning stemming from the apartheid legacy. In imagining a better future Gauteng planners premised it would be based on the services and tertiary sectors that required an efficient and world- class light rail system.

The Gautrain commences in the south of the Johannesburg inner city at Park Station and then extends to the upmarket financial districts of Rosebank and Sandton. The track then splits into a northern or eastern vein. The eastern route leads to Marlboro, Rhodesfield and OR Tambo International Airport while the northern route extends to Midrand,

Centurion, Pretoria and Hatfield Stations. The train route is supported by a comprehensive feeder and distribution fleet of 125 buses. The bus service comprises 430 kilometres of routes with bus stops every 500 metres. Safety and security features on the buses include radio communication and satellite tracking of vehicles. The bus facilities are also complemented by extensive parking facilities for drivers who also utilise the train (Sieburg 2009). A total of 96 by 4 car trains were commissioned at inception with a carrying load of 450 passengers. The railheads are supplied by Bombardier and are a customised version of the Electrostar train set (Gauteng Management Agency Annual Report, 2013). Despite initial cost estimates of R 7 billion the final cost of the project escalated to in excess of R 32 billion.

4.2.2 Financial structure

Ownership structure

The Gautrain is registered as a Public Private Partnership (PPP) of the Gauteng provincial government. A concession agreement between the province and the Bombela concessionaire is the basis of all subsequent contracts. The concession agreement is a complex PPP with a total of 385 contracts, subcontracts, schedules and financing agreements. The shareholders of Bombela consist of key equipment, service and construction providers that jointly executed the construction of the Gautrain. The shareholders and respective shareholding in the concessionaire company Bombela are Murray and Roberts (M&R) a leading engineering, contracting and construction service, Strategic Partners Group (SPG) a black owned company established with the express purpose of participating as a black economic empowerment partner, Bombardier which manufactures trains and signalling equipment and offer customised design, build, operate, and maintain transportation solutions, Bouygues which provides transportation solutions, J & J Group a South African based investment company, and ABSA, a leading South African bank. A key participant in the PPP is RATP that is not part of the Bombela consortium but owns a 51% in the Bombela operating company. A schematic of key parties in the Gautrain PPP, together with each participant's shareholding in the various parts of the Bombela concessionaire, is reflected in Figure 4-1 below.

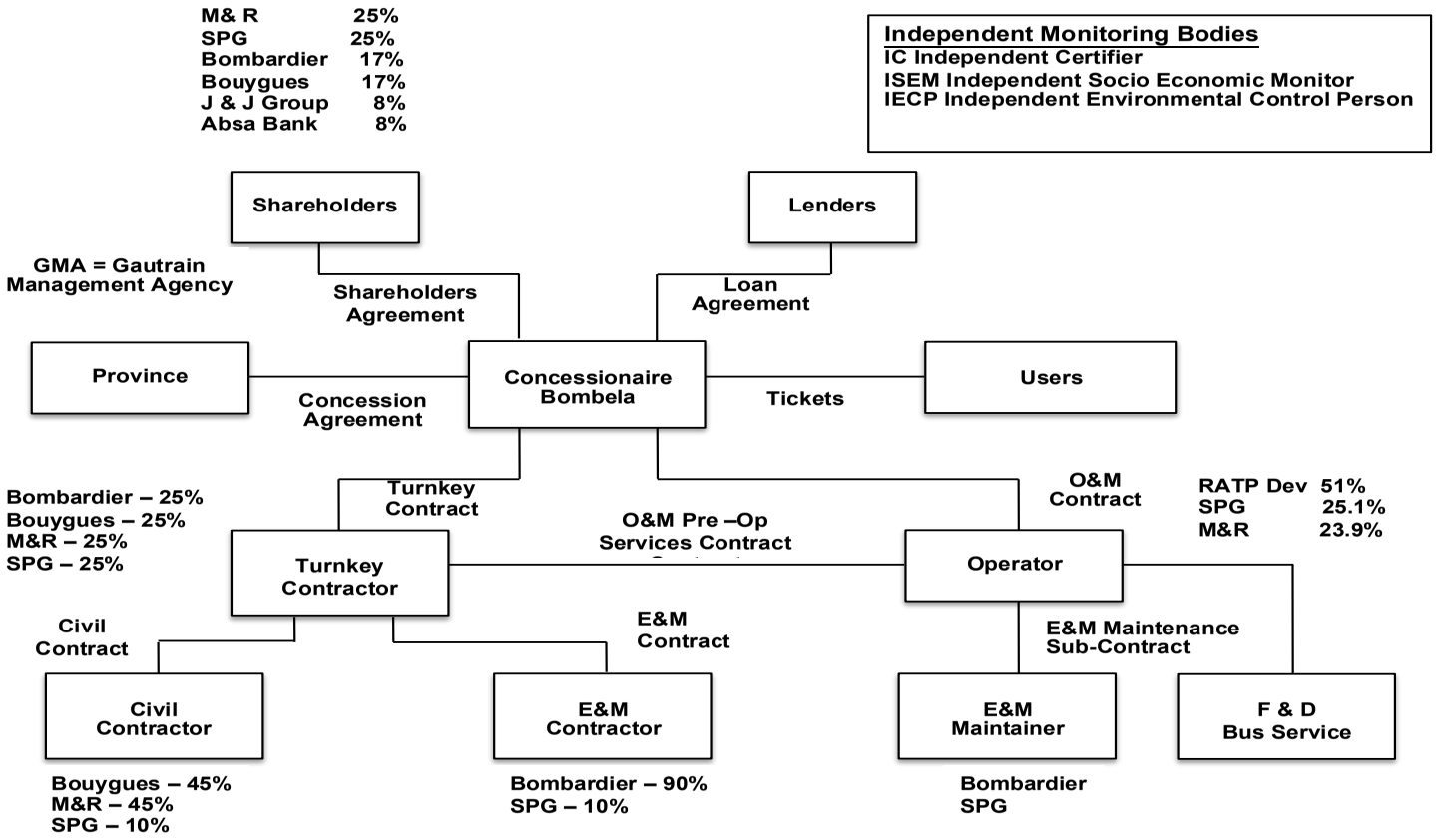


Figure 4-1: Gautrain Contractual Structure (Sieburg, 2009)

How the financing was arranged

The initial pre-feasibility study on the Gautrain was technical in nature and focused on the cost and challenges of getting a train line from Pretoria to Johannesburg. Because of the rudimentary nature of the study the initial forecast cost was “hundreds of millions…it was just ludicrously wrong”. The initial stage however stimulated people’s imagination about what was possible. At this juncture the Gautrain was a provincial venture and there was minimal engagement with national government, with the province anticipating providing all the requisite investment capital. A significant change came about in 2000 when National Treasury (NT) announced the Public Private Partnership (PPP) framework under Treasury Regulation 16. This made it mandatory for the project to obtain approval from NT. This turned out to be a fortuitous development with described as “a brilliant move…given where the project was at the time…I think that if they hadn’t come through that window and got National Treasury advice…and ultimately funding support, the Gautrain wouldn’t have happened”. The engagements with NT were sometimes quite adversarial but the outcome was sound advice and from 2000 the project fell within a regulated environment and a full feasibility study became mandatory. The initial plans regarding capital sources were premised on a R 25.2 billion fixed price turnkey arrangement with contributions by National Government 44.2%, the Gauteng provincial government 26.1%, borrowings by the Gauteng provincial government 18.4%, private sector equity 1.8%, and private sector borrowing 9.5%.

On 25 January 2007 negotiations between Bombela and the commercial banks concerning the debt portion reached closure. An amount of R3.1 billion was to be advanced with Rand Merchant Bank and Standard Bank acting as lead arrangers. Nedbank was appointed as the Participant responsible for managing the project’s financial transactions and issuing the project bonds. The debt component from commercial banks was made up of two tranches of senior debt. The first tranche had a vanilla-floating rate while the second had a rate linked to the Consumer Price Index (CPI). The senior debt was supplemented by mezzanine funding and standby facilities. The commercial banks contribution was therefore limited with senior debt facilities amounting to approximately 10% of the project’s capital expenditure.

The national and provincial governments committed to fund R 22 billion by way of a grant. Bombela shareholders injected R 500 million equity together with a standby equity facility of R150 million. It was anticipated that performance guarantees and credit facilities provided by contractors

over the 54-month construction period would amount to R 3.3 billion. From these facts it is clear that capital structure was not a primary issue on the Gautrain as the government grant was expected to cover 88% of the capital expenditure. Capital availability and access was the primary consideration and as a result the capital structure differs substantially from most project finance transactions. The commercial banks applied private sector principles and extended credit only to the extent that the forecast cash flows would support and service this debt. On account of these factors the Gautrain ended up with a debt to equity ratio of approximately 28:72 on completion of construction. The massive equity component largely from the public purse reflected the fact that this was primarily a government-funded project.

The commercial bank's enjoyed a high degree of comfort on this transaction as a result of the massive capital injection by the public sector. The PPP regulations and the rigorous process the project had to navigate prior to execution also added to the commercial banks sense of security and well-being. Bankers expressed overall satisfaction with advancing the facilities because they "had very good lawyers ensuring all of the EPC arrangements and contracting arrangements had the right risk allocation…and the lenders are indemnified from residual contracting risk…delivery was not a concern…it was more [concern] around the timing aspects…we were concerned that there were going to be delays to the implementation of the project". The capital structure was impacted by the fact that the project budget commenced at R25 billion and the project was finally concluded for approximately R 30 billion. This excess was predominantly driven by changes in scope that led to variations in the project. As per the concession agreement the cost of scope variations was borne by the provincial government and not by the concessionaire.

Possible enhancements to the capital arrangements are qualitative in nature as opposed to quantitative. These include an explicit exit strategy for certain equity investors in Bombela who may not want to be invested for the full 25 year PPP concession period after they have fulfilled their contractual requirements, and the venture is fully operational. The current arrangements for shareholders to exit appear to require the consent of the province and only under certain prescribed circumstances. The risk exposure of equity investors exiting prematurely could exacerbate moral hazard by leaving latent risks with remaining shareholders. During the course of 2014 discussions regarding the refinancing of the capital debt portion of the Gautrain took place. Whilst these interactions did not result

in a concrete decision, interviewees expressed the view that “it will definitely be refinanced, there is no question”.

4.2.3 Key risks

The risk exposure of executing a project such as the Gautrain is extensive. The core philosophy in managing risk by the Gautrain Management Agency was to firstly allocate it to the best party to manage it by way of contractual arrangements, but also to ensure that sub-contractors had the capability to effectively manage the risks they took on.

Regulatory and environmental

The South African government (Department of Transport) has indirect control of the national railway grid through two major parastatals, namely Transnet and PRASA. In order to fulfil the national treasury PPP requirements, an application to develop the Gautrain was submitted and approved by both national and provincial governments. This process was achieved with minimal friction on account of the fact that the development of the Gautrain was in line with the national and provincial transport development plans, and there were no other parties seeking a similar regulatory approval. The Gautrain project was subjected to an EIA that took place over 2002 – 2003 that incorporating key steps such as concept provisional validation, preliminary design and costing, completion of the feasibility report. Procurement pre-qualification was conducted in terms of PPP regulations. Post construction, and to ensure compliance with the environmental management plan (EMP) a project environmental co-ordination committee was established until it was superseded by the Safety, Health, Environment and Quality management (SHEQ) department of the GMA. Legal challenges relating to the environmental impact (heritage site contamination and noise pollution were key concerns) of the Gautrain based on the route were brought by a number of parties. The legal challenges were all addressed in the Gautrain’s favour. This can be attributed to the fact that “the environmental process had been followed [and] public participation had been exhausted”.

The methods for compulsory acquisition of land and obtaining of servitudes for the Gautrain are governed by the Gauteng Transport Infrastructure Act (GTIA). The province was therefore responsible for the proclamation and acquisition of applicable land tranches and the administrative requirements relating to these. The Provincial Roads and Transport department worked in conjunction with the Provincial Support Team to build the necessary technical, legal and administrative skills to

perform this function. In the planning stages it was forecast that 1000 properties would need to be expropriated. This figure was in excess of 20 times the number the department historically processed on an annual basis. With the completion of construction, the land acquisition function is primarily focused on ensuring that all administrative requirements have been completed, the maintenance of the land section of the fixed asset register, and the resolution of 24 compensation court cases that remain outstanding.

Construction and technology

A key pillar in the risk management process of the Gautrain is the turnkey nature of the concession agreement. This meant that the project was constructed and executed for a fixed price. This was essential in systematically dispersing the risks relating to the construction of the Gautrain from the government sponsors to Bombela. The sponsors opted for standard gauge rail tracks as opposed to the narrow gauge format used on existing rail lines in South Africa. This was to ensure that the project utilised proven formats that had been successfully commissioned, including being already aligned to rolling stock and other components that made up the overall rapid rail system. The emphasis was on tried, tested, and proven modern technology. The provincial government also made use of performance and retention bonds to induce the concessionaire to make good on its contractual obligations, or face the imposition of compensatory measures. Variation increases during construction were applicable in two specific circumstances. The first was where variations were mutually agreed upon by the GMA (and secondly where cost inputs escalated at a rate above the official consumer price index. In the case of the former, where variations required additional capital expenditure, the concessionaire was obliged to follow an open market tender process and obtain the approval of the GMA

Credit

The credit risk on the debt component of the Gautrain was limited on account of the conservative gearing, and the substantial government contributions highlighted in the financing arrangements above. It can be argued that the Gautrain enjoyed an implicit sovereign guarantee due to the massive capital contributions of the national and provincial governments, its significantly discounted value as a liquidated asset, and the political ramifications of its discontinuance. Providers of debt capital sign agreements directly with Bombela and disburse funds accordingly.

Foreign exchange

The Gautrain had extremely large foreign exchange exposure on account of its high imported capital equipment component, the extended lead times from ordering and delivery of key parts, and the nominal size of the transaction both in rand and dollar terms. Mitigation of this foreign exchange risk occurred in two parts. The smaller exposure was in the Bombela consortium that hedged this risk by way of a number of hedging instruments procured from local banks. The consortium also went one step further and hedged itself against adverse movements in the interest rate to fix the cost of funding. The largest exposure lay with the Gauteng provincial government. The pricing for foreign exchange hedging instruments over a 5-year profile from the commercial banks was extremely prohibitive on account of rand exchange rate volatility. The authorities resolved that National Treasury would effectively take on the foreign exchange risk by hedging Gauteng Province's exposure through the South African Reserve Bank. This courageous decision that exposed the national government to potentially large foreign exchange losses ultimately culminated in savings of approximately R 425 million.

Patronage guarantee

Arguably the biggest risk in the conceptualisation and shaping of the Gautrain related to the extent to which Gauteng residents would use the service. This was a risk that the private sector participants were not prepared to take. Through negotiations and input from legal, technical and financial advisors a novel solution was formulated. In its first iteration the solution required each bidding consortium to submit its patronage forecast. The higher the patronage forecast was and the closer it was to the provincial projection the more points the bidder was awarded on that particular metric. The Gauteng Provincial government then effectively underwrote the difference between the forecast submitted by the bidder and the province's patronage projection. This underwrite came in the form of a patronage guarantee or MRTR. The patronage guarantee is a mechanism put in place to facilitate the concessionaire's ability to cover its operating, maintenance, and capital costs. It is computed by taking into account the number of people using the system, the value of fares, customer points of entry and exit, the distances travelled by customers, usage of ancillary services such as buses and parking, and the amount of time taken for users to opt for public transport away from private means. Underpinning the patronage guarantee is the understanding that the provincial government would support the concessionaire for patronage revenue below a certain level. Above that level, no support is given. The

patronage guarantee amounted to R 830 million, R 1.03 billion, and R1.5 billion in 2013, 2014, and 2015 respectively. This mechanism reduced the demand risk to private sector stakeholders to an acceptable level allowing the banks to package the debt facilities in a manner that would be satisfactory to their credit committees.

Political

The political will to proceed with the Gautrain extended to both provincial and national government officials and principals, and the ANC at both levels. This gave the project immense credibility and meant it was endorsed by key institutional political actors, as opposed to individuals. The project has retained political support despite the fact that its execution has spanned four different provincial Premiers and three different Presidents. Public perception towards the project was tainted by a perception of elitism implying that the project would serve middle class as opposed to working class clientele. Collating statistics and revealing the broad based user profile of the trains has largely allayed these political concerns. The change in the perception of the Gautrain is captured anecdotally by sceptical newly elected public officials who "have come in and said 'Yis, this middle class commuter service that takes a few whities up and down from work to home'…when they find out the facts about it they say 'we need more of these'…that leads to [on-going] buy in".

Operational

Operationally the risk management process involved the population, management and control of an integrated risk management register. Risks are scored based on their potential impact, quality consequences, and financial ramifications. They are then categorised as minor, major, or critical risks. To ensure accountability for each risk only has one owner who must manage the risk through implementing mitigating measures. The Gautrain encountered a number of unanticipated non-mainstream risks. These included electricity load shedding in 2008 as a result of generation constraints. Cable theft on the Gautrain also caused a number of early disruptions and stoppages and security measures had to be put in place to mitigate against this. Labour stoppages and illegal strikes by the bus drivers had a knock on effect on train passenger volumes in 2012 and resulted in the suspension of the service when aggrieved strikers shot at a Gautrain bus in March 2012. Throughout the execution of the Gautrain venture, risk management has been integrated into the entire project management process.

4.2.4 Institutional and legal arrangements

The Gautrain PPP is a Build and Operate (BO) arrangement. All members of the Bombela consortium with the exception of Bouygues are locked into both the construction and operating phases of the project. This assists in aligning their respective contribution in the construction phase to the success of the venture in the operating phase. It also allows the provincial government easier recourse to these parties in the event that any malperformance in the construction is detected after commissioning.

The Gautrain Management Agency and Project Team

The Gautrain Management Agency (GMA) is a provincial public entity established by way of a piece of national legislation, namely the Gautrain Management Agency Act of 2006 (GMA Act). The GMA Act directs the GMA to manage, co-ordinate and oversee the Gautrain. This includes helping the province in implementing the goals and objectives of the Gautrain, manage the relationship between the province and Bombela in accordance with the requirements of the concession agreement, ensure the interests of the province are protected, and look after and manage and maintain the assets of the Gautrain. By establishing a dedicated agency, the authorities institutionalised the project management of the Gautrain from commencement through to the expiry of the concession agreement. The GMA is structured into four areas to execute its responsibilities, namely, technical and commercial, finance, legal and marketing, and is the apex governance institution. The extensive contractual documents detailing the rights and obligations of all parties, enabled each stakeholder to have clarity as to what they were expected to deliver on. A comprehensive document management system to track correspondence and communication between stakeholders was implemented so an audit trail of decisions and commitments made by all parties was in place. Supporting these measures was a detailed dispute resolution mechanism. This made use of arbitration rather than the courts for a more rapid resolution of disputes.

Fundamental to the Gautrain's success was the continuity in the project team from conception to operationalisation. Interviewees noted other project experiences Discontinuity in the project team has the potential to sabotage viable ventures. The Gautrain project team was "very strong from start to finish" and despite not always having the same people consistently "having someone like Jack van der Merwe [CEO – GMA] is a big factor in continuity". In addition, the project leaders ensured that "as

the project changed phases, the right skills were brought in at the right time to keep the overall team strong".

Principal contracts

The Gautrain project is underpinned by 385 legal agreements. The principal contracts are the concession agreement that includes the patronage guarantee, the turnkey contracts for civil construction engineering and maintenance, and the operations and management contract. The concession agreement had initially been crafted based on a standard PPP contract. Early on in the process a decision to draft a bespoke contract was made and initiated. The sponsors sought to ensure that at its core the concession contract articulated what needed to be done and by whom, but importantly clearly expressed what would happen when things went wrong comparing it to a "very strict anti-nuptial contract". The concession sought to align stakeholder interests by structurally embedding incentives and penalties that would encourage specific outcomes. The motivation was premised on the view that "anyone who tells you the private sector performs exceptionally just because they are private sector is talking rubbish…the private sector performs because it is incentivised or dis-incentivised not to do something". Incentives including the patronage agreement detailed above were conditional on meeting operational targets including 98.5% availability and 95% punctuality.

The selection process for the successful bidder initially expected each to bear costs of bidding. This was amended due as it was believed that because these costs were sizeable bidders would backload much have the technical and design work, slowing down the pace of the project's execution. Back-loading key aspects of the project design to a post successful bid application increased the risk that bid price would be premature, inaccurate and unworkable, again compromising execution. At the same time the sponsors sought to ensure the competitive bidding process retained as many credible bidders as possible and resolved that "the need to maintain a competitive tension was much greater than the cost of the element of support" on bidding costs. This assisted in speeding up the project as key aspects of the design work were completed a part of the bid process, shortening the project's delivery time. As highlighted the contracts for civil construction, engineering and maintenance, and the operations and management contract were turnkey arrangements, dispersing risk from the sponsor and driven by explicit goals, performance metrics and related deadlines. The fulfilment of the contractual arrangements was verified by 3 Independent Monitoring Bodies. The certifier was responsible for determining completion of the works, the

socio-economic monitor reports on the socio economic benefits derived from the project throughout its various stages, and the environmental control person monitors and reports on the environmental impact of the project.

4.2.5 Lessons learned

A robust project plan with effective co-ordination across project streams and on-going evaluation was an essential feature in the development of the Gautrain. This ensured responsibility, accountability, and responsiveness was embedded into the full project life-cycle. The project was divided up into distinct phases and at the end of each phase critical decisions to reconfigure or consider discontinuing the project were made. This was supported by an exceptionally strong advisory team of external legal, technical, financial, and related consultants. The backbone behind the project plan was an effective project team. Project team members were drawn from both the public and private sectors and were professionally familiar with each other. The experienced project team assembled had a “very strong existing network of relationships” between themselves and within the participating metropolitan municipalities, PRASA, the provincial and national governments, and other key stakeholders which enabled them to connect, communicate and co-ordinate activities. The project team was underpinned by “loads of liaison and steering committees [that were] the manifestation of the underlying network of relationships”. It is important to “be careful not to say by creating these structures you get a network. That is not true. The network must pre-exist for the structures that come onto it”. The structures institutionalised a pre-existing network and the synergies percolated to all project players in the project execution by embedding risk management into the project architecture.

Due to the highly visible and disruptive nature of the Gautrain, a communications team was established. This function was taken seriously in order to manage public perception, and implicitly maintain political support. The key deliverables of the communications team was to ensure communication was always flowing to stakeholders even when things were at their worst and the public perception was strongly against the project. Qualitatively this engagement was not about advertising but was about “keeping in touch with stakeholders, talking to people who don’t like you…and getting back to people…continual engagement”. The intensity of the work performed by the communications team ensured there was rarely a void during the construction phase and their role has continued into the operations stage. The operations phase of the project has substantively

increased resources to this function to monitor public perception on a daily basis, including a team of people who look at social media on a real time basis, and proactive engagement across media platforms especially for potentially negative news.

Projects such as the Gautrain may better optimise the governance arrangements by having a category of disinterested shareholders who are not party to any of the underlying sub-contracts. This may help resolve adverse shareholder dynamics that may occur as a result of conflicts of interest between equity shareholders who are also sub-contractors. The ability to attract equity investors to PPP via a concession company may also be enhanced by having an exit clause in the agreement that allows equity investors an exit path under prescribed conditions and with the consent of key stakeholders.

The Gautrain has had a massive impact on land values around stations, none of that was captured for the public purse. With hindsight the PPP could have been structured to capture some of these gains for them to contribute to the project capital structure. This aspect is envisaged to be incorporated into the second phase of the project. A number of ways to capture the commercial and real estate benefits of a light railway system have been applied in countries including the United Kingdom and the United States. These range from a small levy on residents in the respective city or province who will reap secondary benefits from the infrastructure, to the route being determined by businesses prepared to contribute to the funding through a capital contribution.[3]

The patronage levels of the Gautrain have exceeded the most optimistic projections. By inference this has resulted in significant benefits accruing to the concessionaire company in the form of much higher internal rates of return on the project than originally forecast. The downside of Bombela was also limited by the provision of massive grant funding and the patronage agreement. Public treasuries may possibly consider embedding mechanisms into the contractual arrangements where beyond certain specified profits or rates of return, the public purse also participates in super profits that may unexpectedly accrue from projects of this nature.

One of the striking characteristics of the Gautrain stations is that they lack the retail and customer amenities such as restaurants and book and newspaper outlets synonymous with urban rail systems in developed cities such as London or New York. This occurred as a result of the fact that the

[3] See Becker (2001) and Becker and Patterson (2005).

Gautrain was the first project of its type on the continent and “the drive the first time round was just to design and build a [urban rail] transport system and operate it well”. Phase two of the project is also expected to address this aspect on new stations and potentially on existing ones as well. The feasibility studies for phase two of the Gautrain are expected to be completed in 2016. These studies will address a range of issues including the routes, where the new stations will be located, and clarity on the way forward. There appears to be strong appetite for phase two prospects, anticipated declines in the risk premium as a brownfields expansion project.

4.3 The Pebble Bed Modular Reactor

FACT SHEET	
Project Description	▪ Design, development, and project management of existing Pebble Bed Modular Reactor technology ▪ Construction of prototype and demonstration of commercial viability ▪ Develop and supply of export market for an operating and commercially viable PBMR
Key Personnel to Pebble Bed Modular Reactor (Pty) Ltd	▪ Jaco Kriek – CEO – 2004 - 2010 ▪ Alastair Ruiters – Chairman ▪ Lynette Milne – CFO ▪ Barbara Hogan – Executive Authority – Minister of Public Enterprises: Republic of South Africa 2009 – 2010 ▪ Alec Erwin – Executive Authority – Minister of Public Enterprises: Republic of South Africa 2004 - 2008 ▪ Phumzile Mlambo-Ngcuka –Minister of Minerals and Energy: Republic of South Africa 1999 - 2005
Contractors	▪ Eskom Enterprises ▪ Pebble Bed Modular Reactor (Pty) Ltd
Objectives	▪ Develop South Africa's Nuclear Technology and Related Industries ▪ Address South Africa's growing electricity requirements and energy mix ▪ Stimulate economic growth, investment, new development, job creation, and electricity generation capacity on the African continent
Funding and Shareholders	**Shareholder** ▪ Eskom Holdings– 100% **Funders** ▪ South African Government – 80.61% ▪ Eskom– 8.67% ▪ Industrial Development Corporation –4.78% ▪ Exelon –1.09% ▪ Westinghouse –4.85%
Products and Services	▪ Reliable, economic and efficient nuclear power alternative ▪ Enhanced reliability and safety ▪ Rapid speed of construction and deployment relative to traditional nuclear stations ▪ Suitability of "pocket nuke" for export to international market with geographically dispersed electricity needs

4.3.1 Background

The Pebble Bed Modular Reactor (PBMR) is an initiative by the South African government through state owned electricity company Eskom to commercialise High Temperature Gas-cooled Reactor (HTGR) technology in the construction of a fourth generation nuclear power electricity generating unit. The PBMR differed from the world's existing nuclear fleet of Pressurised Water Reactors (PWR) and related Boiler Water Reactors (BWR) in the following key respects. Firstly, the unit size of the PBMR has a power output of 110MW – 400MW. A typical PWR has a corresponding output of 900MW – 1200MW. Secondly, the primary coolant in the PBMR is helium gas as opposed to water for the PWR. Thirdly, with the PBMR the coolant drives the turbine directly whilst with the PWR the coolant is funnelled through a heat exchanger that subsequently generates steam and propels a steam turbine. Fourthly, the PMBR utilises graphite as the moderator rather than water. Fifth, the PMBR can be refuelled whilst it is still operating unlike the PWR that needs to be shut down annually for refuelling, and finally the PBMR utilises uranium enriched to 7.5% whilst conventional PWR utilises 3% enriched uranium.

The particular attraction of the technology included its higher thermal efficiency, more efficient use of uranium feedstock and consequently less radioactive waste, and superior safety features to PWR with the latter being a key public concern regarding nuclear power (Thomas and Heyde 2001). The modular nature of the PBMR meant that capacity could be installed rapidly while scalability could be attained by adding modules enhancing flexibility and the ability to match supply with demand. Module power output was highly elastic with the ability to move from half power to full power and back to half power in a matter of minutes. The ability to deploy a "pocket nuke' to areas not served by a conventional transmission grid added to the potential of the PBMR particularly in Sub-Saharan Africa and other export markets where transmission infrastructure was underdeveloped. The forecast 2-year construction lead times for PBMR technology relative to 8 years for large thermal, nuclear, and hydroelectric projects added to its appeal. Finally, it appeared that the PBMR would be more economically efficient than South Africa's coal based stations. It was projected that a commercial scale plant with ten modules and a capacity of 1 200 MWe could be constructed for US$ 1000 per KWe installed. The equivalent cost for a new coal fired power station was US$ 900 per KWe installed (Nicholls 2001).

The attempt to commercialise the PBMR from 2000 to 2009 took place in an era when the world was faced with exponential growth in energy

demand and growing awareness of the adverse environmental impact of fossil fuels. A number of countries have attempted to commercialise HTGR technology including the USA, Germany, UK and Japan. Despite these failures ABB and Siemens pooled their intellectual property into a company called HTGR Gmbh and sought to license the technology to a number of countries including South Africa. This licensing arrangement forms the foundation for the development of the PBMR in South Africa.

In 2001 Eskom was one of the world's largest electricity generating utilities with a total capacity of almost 40 000 MWe. Of this approximately 85% was generated by coal-fired stations, and South Africa's sole nuclear power station Koeberg contributed 7%. The coal-fired power stations are predominantly located inland in close proximity to the fuel source. An increasing proportion of power consumption was taking place in coastal areas necessitating an extensive transmission network and significant capital and maintenance related expenditure. Despite excess generation capacity in the 1990's and early 2000's it was evident that even with low economic growth rates of 2.5% the excess generation capacity would be exhausted between 2005 and 2010. Alternative base-load capacity in the form of gas and hydro were not viable. Taking these factors into consideration Eskom began investigating the PBMR in 1993 followed by a pre-feasibility study in 1995 and a techno-economic study in 1997. By 1998 the project had reached a stage where full scale engineering design was taking place (Nicholls 2001).

4.3.2 Financial structure

Ownership structure

The Pebble Bed Modular Reactor (Pty) Ltd is 100% owned by Eskom Holdings. Eskom itself is 100% owned by the South African government. Strategic partners were purposefully sought for technical and to a lesser extent financial contributions. The consortium members of the PBMR together with their financial contributions expressed in rand terms and as a percentage of their overall contribution are the South African government (R 7 595 million–80.61%), Eskom (R 817 million–8.67%), the Industrial Development Corporation (IDC) which is a local (R 450 million – 4.78%) DFI, Exelon (R 102 million–1.09%), which is a USA, based utilities company, and Westinghouse (R 457 million–4.85%) that is a USA based equipment provider for the commercial nuclear electric power industry.

How the financing was arranged

The PBMR was financed on a "pay as you go" basis with various participants making capital contributions as highlighted in Table 4.2. As such references to the capital structure are largely irrelevant. The FOAK nature of the project made prospects of raising debt capital from the commercial banks highly improbable. The lack of commercial lenders potentially exacerbated the challenges the project faced as the latter could have brought financial rigor and oversight on budgets, deadlines, and generally enhanced accountability. It is estimated that by April 2000 the South African government had expended R 120 million in exploratory work on the PBMR before making a firm decision to fund the commercialisation of the concept. At the time it was forecast that the venture would yield revenues of R18 – R20 billion per year. Table 3.2 above details how the South African government invested at least R8 billion in the PBMR by way of direct budget allocations. Indirect contributions by state owned companies Eskom and the IDC amounted to more than R1.2 billion. The total invested directly and indirectly by state institutions amounts to approximately R 9.4 billion. The financial contribution of the international stakeholders Westinghouse and Exelon is relatively modest in comparison amounting at under R 560 million.

The uncertain funding model of the PBMR was further compromised when Eskom and the international partners stopped contributions or exited the venture leaving the South African government bearing the funding requirement, and resulting in sporadic capital injections from the fiscus. This precarious funding model was explained as "we get a phone call…Mbeki and Erwin and Manuel had a meeting and …PBMR is getting R 6 billion". Representatives of the PBMR would respond "okay but we need 18", and the caller would reply, "the government will give a third… and I will go and get the investors". Third party investors from other countries were considered and almost came to fruition. A bilateral agreement was signed with the United States and a Memorandum of Understanding with the Chinese government. Very little value was derived from these arrangements, as Minister Erwin was hesitant to work with other countries fearing they would take over the project and steal the technology.

Key to the failure of the funding model was Eskom's decision not to commit to buying the first 10 commercial modules as originally envisaged based on value for money considerations.

Table 4.2: PBMR Capital Contributions Per Partner (PBMR Annual Financial Statements, 2000-2010)

Table 6.6: Capital Contributions Per Partner (PBMR Annual Financial Statements, 2000-2010)

Source	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	*Total Contribution*
South African Gvt	R -	R -	R -	R -	N1	R600 000 000	R508 772 000	R1 301 862 000	R2 194 976 000	R1 750 000 000	R1 737 750 000	***R8 093 360 000***
Eskom	R131 658 267	R98 979 060	R165 099 862	R314 965 009		R110 165 000	R -	R -				***R820 867 198***
IDC	R46 400 000	R 82 850 000	R105 002 482	R 39 775 721		R35 000 000	R192 800 000	R -				***R422 276 760***
Exelon	R23200 000	R 41 425 000	R34 702 893	R 1 970 986		R -	R -	R -				***R101 298 879***
Westinghouse	R -	R -	R -	R -		R -	R 146 262 000					***R146 262 000***
BEE Partner	R 36 162 673	R -	R -	R -		R -	R -	R -				***R36 162 673***
British Nuclear Fuel	R41 760 000	R74 565 000	R126 599 765	R 56 141 726		R -	R -	R -				***R299 066 490***
Total	**R279 180 940**	**R297 819 060**	**R431 405 000**	**R333 302 000**	**R -**	**R745 165 000**	**R847 834 000**	**R1 301 862 000**	**R2 194 976 000**	**R1 750 000 000**	**R1 737 750 000**	***R9 919 294 000***

1. *The BEE Partner stake was transferred to Eskom from 2001*

N1*- An amendment to the financial year-end from 31 December to 31 March culminated in the one set of financial statements for the years 2004 and 2005 covering a 15-month period.*

Eskom benchmarked the per kilowatt costs of the PBMR with its existing coal powered stations and argued it was willing to pay approximately US$ 1 000 per kilowatt. This formula may have been flawed because the coal powered fire stations in Eskom's fleet were largely legacy constructs and did not reflect the contemporary costs of building a new coal powered fire station, and coal prices were depressed subduing the generation costs.

4.3.3 Key risks

Regulatory and environmental

Legislation prescribed that the PBMR required authorisation from the Nuclear Energy Corporation of South Africa (NECSA) as the apex regulatory authority. While Eskom argued that the PBMR technology was intrinsically safe, regulatory approval was needed for the engineering of safety barriers that arise during the construction phase, the licensing phase, and the regulatory regime once the plant has been commissioned. Eskom projected that the feasibility and licensing costs would be US$ 64 million and US$ 5.7 million respectively. Eskom anticipated that regulatory approval in South Africa would be obtained within 4 years. Regulatory approval for completed engineering designs proved to take a lot longer than expected due to limited experience and capacity constraints within NECSA, and the need to comply with international standards and protocols. This significantly delayed the speed of development and the related costs.

Despite an extensive and complex EIA including complying with legislation, regulations, policies and multi-lateral treaties, many of the environmental risks were automatically mitigated by plans to locate the prototype within close proximity to the existing Koeberg nuclear power station. Final approval was extended on account of the fact that different regulatory authorities had to independently verify different aspects of the proposed venture applying their own procedures for approval and governance. The PMBR EIA was performed on two broad pillars. The first pillar detailed the legal and regulatory requirements and the degree to which the PBMR company and Eskom had complied with these. It also highlighted the need to consider alternative energy sources. Significant evaluations on radiological waste management and final disposal were carried out, including the controls surrounding inadvertently facilitating nuclear weapons proliferation. The assessment also considered the risks relating to radiologically induced cancers and how the design, operation and waste disposal features of the plant would prevent these. The second

pillar considered the project issues and impacts namely, social impacts, economic aspects, biophysical or sensitivity aspects, and technical suitability considerations. This was supplemented by an extensive public participation process in Gauteng, KwaZulu-Natal and Western Cape provinces between 16 and 30 May 2002, and an opportunity to give input into the draft report between 4 June and 4 August 2002.

Prominent environmental organisations were “in principle” entirely opposed to the PBMR and nuclear energy. This was informed in part by the view that nuclear power is inherently unsafe. The lobby argued that the potential incalculable consequences of a nuclear accident were not an appropriate risk for society to take. The large upfront investment required for nuclear power was also a major contention, including the societal and economic ramifications where these costs are borne by small businesses and consumers. The matter of waste disposal and South Africa’s incomplete plans regarding waste were another significant concern. Environmentalists also argued the costs of decommissioning of nuclear power plants are rarely factored into the project evaluation and these costs are significant enough alone to alter the economic and financial justification for a nuclear power station.

The opportunity costs in expending large portions of capital on nuclear power versus other pressing socio-economic priorities was questioned, together with concerns regarding the integrity of the procurement process. In this regard environmentalists argued that the South African government is currently subsidising the nuclear industry to the value of the R 600 million allocated to NECSA via the national budget. Environmentalists further argued that more flexible peaking power alternatives such as gas offer superior capital investment returns and their elasticity makes them more responsive to power demand in the South African economy. The final reason for objections to the PBMR and nuclear power include the challenges European countries are encountering regarding the decommissioning of legacy plants as they reach the end of their lives and the exorbitant costs involved.

Construction and technology

Whilst the executive management team was comprised primarily of commercial and legal practitioners, the core PBMR project related to scientific engineering and nuclear outputs. It was difficult for the management team to hold the engineering and nuclear personnel accountable as the management team had insufficient technical expertise. The project sponsors also failed to define what the final product was going

to be from the outset. The first contentious issue in this regard was the capacity of the reactor. The original PBMR was envisaged to have a capacity of 180 MW. In response to Eskom's argument that this was not competitive, the designers increased the plant capacity twice until it reached 400 MW. The larger reactor brought with it new technical complications that had been resolved in the 180 MW such as temperature challenges and the composition of the fuel feedstock. Another key technical aspect that was not established from the outset was whether the plant should use the direct or indirect cycle for thermal heat transfer, with the former requiring greater technical innovation as the process was not technically established. The result of this dynamic landscape was massive delays and increased funding requirements. A change in one part frequently necessitated changes on significant portions of the remainder of the design, and all changes had to be submitted to the regulatory authorities for evaluation and approval. The construction of the prototype was originally scheduled for 2003 and was subsequently pushed out to beyond 2009. Management became aware of the scope and depth of the difficulties much later than they should have. Despite the huge technical challenges, and concerned that the project would be terminated, the technical team conveyed a sense of progress rather than explicitly laying out the significant difficulties, ultimately exacerbating financial losses. By the time the PBMR principals submitted the cost projections for the prototype these had increased 7 fold from the original budget.

Market risk

The formulation of demand in the export market appears to have been compiled with insufficient rigour. The forecasts assumed the PBMR would win 2% of the power plant market share and therefore sustain annual sales of 30 modules, 10 being from South Africa. These forecasts were backed by letters of intent from Eskom and Exelon to buy 10 and 40 units respectively in the decade after commercialisation. The letters of intent were not binding on either parties and Eskom's commitment was made on the proviso that the PBMR would be the cheapest option. After the release of a Detailed Feasibility Report by Price Waterhouse Coopers, Exelon exited the consortium. The report downgraded sales to 10 modules per annum. The anticipated export market was essential to enjoy production efficiencies. However, the appetite for nuclear power projects in many key markets was questionable. In Europe, with the exception of France and Finland, the prospects for nuclear power plant orders were highly improbable. The North and South American appetite was also severely diminished with no orders being placed since 1974 having come to fruition.

Canada had developed its own technology that had begun to run into safety and financial viability challenges. In Asia, Pakistan, India and China were pursuing their own nuclear programmes and attempting to develop in house technologies. On the African continent no country was actively pursuing nuclear power despite earlier putative attempts by Egypt and Nigeria. In addition the exit of strategic partners Exelon, Westinghouse, and British Nuclear Fuel killed the prospect of export markets outside Africa. Eskom's eventual decision not to commission the first 10 order as originally planned meant that there was effectively no existing market for the PBMR.

Political risk

Political support for the PBMR can be described as shallow, erratic and fragmented. There was limited engagement by South Africa's political principals. Eskom had acted as the principal driver and a key financial sponsor but its support waned decisively after the board resolved that Eskom was not a technology developer and made a decision to cease funding of the PBMR in late 2003. President Mbeki was however an ardent supporter of the PBMR and the Minister of Public Enterprises was designated to provide political leadership to the initiative, with a task team including the Director General of the Department of Trade and Industry Alistair Ruiters was established. Despite this high level support at the executive, the Department of Minerals and Energy did not support the endeavour. The shallow support for the PBMR extended to the ruling party alliance made up of the African National Congress (ANC), the South African Communist Party (SACP) and the Congress of South African Trade Unions (COSATU). Affiliates of COSATU in the form of the National Union of Mine Workers and the National Union of Metal Workers were strongly opposed to the project based on the view that the roll out of an extensive nuclear programme could result in the replacement of coal fired power stations, which would result in coalminers losing their jobs. The Minister of Finance Trevor Manuel candidly described his view of the PBMR as "a four letter word". President Mbeki was recalled by the ANC in 2008 and Alec Erwin resigned from cabinet resulting in the removal of the two most senior executive members supporting the PBMR. With political sentiment in the ruling party having moved decisively against Thabo Mbeki, projects that he had championed were contaminated by association and faced open animosity under a new political leadership. These developments left the PBMR project isolated and compromised.

Project management and co-ordination

The co-ordination of public sector institutions critical in enabling the success of the PBMR was severely lacking. At a minimum the PBMR required the active support of the departments of Energy and Public Enterprises, National Treasury, Eskom, the Nuclear Energy Corporation of South Africa (NECSA), and overall cabinet endorsement. The PBMR company's designation as a state owned entity meant it fell under the department of Public Enterprises whereas a more appropriate reporting line would have been to the Department of Energy (DoE). The Department of Public Enterprises was a relatively small department in the government architecture but had to deal with sizeable challenges in a number of public organisations. Entities reporting into the department of Public Enterprises experiencing severe difficulties in 2004 included Eskom, Denel, South African Airways, Infraco and Alexkor. Arguably the capacity of the department to deal with these challenges was extremely stretched. This could have contributed to the diminished oversight that the PBMR received. The development of the PBMR would have been better suited to a reporting line via the Council for Scientific and Industrial Research (CSIR) and the Department of Science and Technology on account of its technical nature. The lack of a co-ordinating body addressing turf wars, vested interests, bureaucracy and bottlenecks resulted in government departments not co-operating with one another and a haphazard and chaotic project process. The lack of application of best practise project management principals in the development of the PBMR compounded its difficulties. There was no explicit project life cycle articulated with attendant project milestones and deadlines. There was also no overall project manager for the different participants. As a result, there were multiple participants including the PBMR company, Eskom, the regulatory authority giving input and feedback, yet there was no party with an overall "helicopter view" of what was going on.

Organisational culture

A significant proportion of the engineers originated from Denel, the state owned arms manufacturer. These employees had developed arms for South Africa during the apartheid era when budgetary considerations were not paramount. This culture permeated PBMR development and intensified financial strains. Whilst staffed with capable and driven employees, the PBMR company did not initially establish the requisite structures to institutionalise focus, goals, discipline and clarity. Internal controls, checks and balances, and accountability mechanisms were severely deficient. The number of employee rose from less than 100 in

2006 to in excess of 800 people. This growth occurred at a time when there was no product on the table and resulted in a massive corporate structure costing R 600 million per annum. Management struggled to put in place sound corporate governance mechanisms whilst at the same time monitor technical progress on the PBMR. Management focus was therefore diluted by having to establish internal operational and control mechanisms while simultaneously trying to monitor, guide, and oversee the technical and scientific development of the reactor.

4.3.4 Institutional and legal arrangements

The primary mechanisms governing the PBMR were the Companies Act and the Public Finance Management Act (PFMA). Other applicable pieces of regulatory, policy and strategic frameworks include Treasury Regulations, the Medium Term Strategic Framework. Parliamentary oversight over Eskom would be spearheaded by the Standing Committee on Public Accounts (SCOPA) and the Portfolio Committee on Energy. Despite Eskom having 100% ownership, the governance structure of the PBMR Company sought to include the non-equity participating members of the consortium by way of a 'co-operation agreement'. The 2009 Annual report of PBMR Ltd states effective control is not exercised by Eskom Holdings Limited, but in terms of a co-operation agreement between Eskom Holdings Limited, the IDC, Westinghouse Electric Company LLC, and PBMR. A shareholder agreement that was intended to replace the co-operation agreement and issue equity stakes to participants never came into effect as government failed to fulfil a condition precedent within the prescribed deadline. The shareholder agreement lapsed and parties reverted back to the co-operation agreement as a governance mechanism. The government's hesitance was attributable to novel nature of the project and co-operation arrangements. It may also have preferred Areva as a partner. The cumulative result of this paralysis added to the uncertainty and lack of clarity regarding accountability for the PBMR. It was not the intention at the commencement of commercialisation for the government to carry the lion's share of the funding responsibility. An original agreement proposed contributions by the original consortium of Eskom (40%), IDC (25%), Westinghouse (22.5%) and Exelon (12.5%). This agreement, together with a subsequently amended version in September 2005 was never signed, and the co-operation agreement never released into the public domain. Factors were further complicated when British Nuclear Fuel sold Westinghouse to Toshiba and facing financial challenges Toshiba reversed a commitment by Westinghouse to inject US$ 25 million into the PBMR. Eskom ceased making financial

contributions to the PBMR in 2004 and the primary driver of the PBMR was therefore the South African national government.

4.3.5 Lessons learned

Key lessons can be derived from the failure of the PBMR. The most glaring is the need to deepen and broaden political support. This is even more critical when the project is controversial and faces significant interest from key sectors of society. Such support is essential when a project encounters significant challenges, which in mega projects such as the PBMR is a virtual inevitability. The need to ensure effective co-ordination between departments and entities and their respective principals integral to the implementation of the project is essential. This 'herding' of participants includes a mechanism that institutionalises the role of each participant and provides a dedicated secretariat that overseas, directs, prompts, cajoles, castigates, and generally facilitates the overall progression of the endeavour. An important factor leading to internal and external uncertainty of the PBMR project was the lack of finality and closure regarding the funding model. It is essential for there to be clarity on the funding model not only for execution purposes but also to signal politically that the venture is a priority project and as such should be accorded the requisite focus. The capital allocated to key facilitators such as the regulatory and oversight bodies has to be increased significantly so that they develop the capacity to effectively and expeditiously execute their mandates. The lack of a robust funding model meant that the R 30 billion required to construct the prototype and proceed to full commercialisation was not available.

Compounding the uncertainty of the funding model was the lack of clarity on the final product regarding the capacity and key aspects of the technology including the direct versus the indirect cycle. Certainty and clarity regarding the final product would have reduced substantially the engineering and technical changes that were necessitated by the multiple amendments to the final product. This would also have contributed significantly to a clearly defined market. As the PBMR was a FOAK development respondents conceded in pursuing the PBMR the South African government could have "bitten off more than we could chew". The scale of engineering, scientific and technological factors that had to be developed and resolved was such that a project of this nature requires massive resources. The project sponsors could have pursued a piecemeal approach to the development of the PBMR including setting key milestones along the project's critical path.

The utility of co-operation agreements and the varying levels of sincerity and commitment partners bring to a project is a key lesson. Westinghouse was in possession of a report detailing the challenges it encountered in previously developing similar technology and its subsequent failure. It withheld this document that contained substantively all the difficulties the PBMR had encountered. Westinghouse was represented on the board of the PBMR company and the representatives would have been keenly aware of their own failures. Westinghouse gave nominal support to the PBMR with a view that if it were successful they would increase their level of commitment and enjoy the benefits of its commercialisation. If however the venture failed to overcome the challenges already encountered at Westinghouse, their investment was not substantial and they could exit.

The final lesson regarding the PBMR relates to understanding the business that you are in. Part of the logic underlying the South African government's pursuit of the PBMR was that if commercialised it would support domestic manufacturing and industrial capacity through the production of modules for both domestic and international consumption. This was a misconception. Even if the PBMR had been successfully commercialised the manufacturing and industrial opportunities would have been limited, because most export markets would have insisted that a significant portion of the manufacturing of components take place in the host countries. Successful development of the PBMR would have essentially resulted in a technology business that would license its intellectual property and this would constitute its largest asset and revenue spinner. The PBMR company has been mothballed with the majority of its staff retrenched. The few remaining tasks involve the maintenance of two large test facilities and a number of assets, managing ownership of 206 patents with a further 40 still in the process of registration.

4.4 Kalkbult Solar Plant

FACT SHEET	
Project Description	▪ The largest solar plant on the African continent on construction ▪ Phase 1 capacity of 75 MW with brownfields expansion potential of 180MW (Phase 2) and 175MW (Phase 3) ▪ Substructure-system: Fixed tilted ▪ Solar modules: BYD 240P6C-30 polycrystalline ▪ Inverter-system: SMA Inverters ▪ Project yield: 2 035 kWh/kWp ▪ Energy produced: 150 000 MWh per annum ▪ Energy equivalent: 35 000 South African households ▪ Area: 105 hectares
Key Personnel to Kalkbult Project Company (Pty) Ltd	▪ Raymond Carlsen – Chief Executive Officer – Scatec Solar ▪ Mikkel Torud – Financial Director ▪ Kari Fremme – Project Director – Scatec Solar
Contractors	▪ SMA Inverters – Inverter system ▪ Kentz – Sub- Engineering, Procurement and Construction ▪ PIA Solar – Design, manufacture and installation of fixed racking systems ▪ Norton Rose: Legal adviser to project sponsors ▪ Bowman Gilfillan and Trinity International: Legal adviser to lenders ▪ Marsh: Insurance advisor to sponsors and lenders
Objectives	▪ Participation in South Africa's Renewable Energy Independent Power Producers Programme ▪ Energy diversification and security of South Africa ▪ Socio-economic development ▪ Establishment of solar projects as viable and competitive offering in energy mix ▪ Monetize the green and environmentally sustainable aspects of project through carbon credits ▪ Effect environmentally friendly energy generation
Funding and Shareholders	▪ Full funding requirement – €200 million (R 2.173 billion) ▪ Scatec Solar AS (Norway) –60% o Norfund Norway (21% effective interest) o Itochu Corporation Japan ▪ Simacel Kalkbult Holding (South Africa) – 20% o Kalkbult Community Trust (12.25% effective interest) o Black Women Community Trust (7.75% effective interest) ▪ Standard Bank (South Africa) – 10% ▪ Old Mutual (South Africa) – 10%
Products and Services	▪ Generation of 150 000 MWh per annum ▪ Operation and maintenance of 75MW Plant over 20 year concession period

4.4.1 Background

The South African Renewable Energy Independent Power Producers Programme (REIPPP) seeks to diversify energy and specifically electricity sources, develop and support of local industries in the provision of related equipment, and enable job creation. It has sought to apply international best practice in its design and execution. The 2011 iteration of South Africa's Department of Energy Integrated Resource Plan (IRP) foresees an important role for renewable energy with a goal of 3 725 MW from this source by 2015.

4.4.2 Financial structure

Ownership structure

The consortium members and shareholders of the Kalkbult Solar Plant are as follows. Scatec Solar AS has a 60% equity stake and is supported by key funders and shareholders in the Kalkbult project including a NOK 190 million capital injection from Norfund Norway. Simacel Kalkbult Holding is a vehicle housing the 20% equity stake held by the local community and in accordance with the Black Economic Empowerment provisions of South Africa's REIPPP. Standard Bank is a leading commercial bank in South Africa and holds a 10% stake. Old Mutual is Africa's largest pension and retirement fund manager and administrator and also holds a 10% stake. Figure 4-2 illustrates the participant and ownership structure.

How the financing was arranged

Kalkbult is reportedly funded on a 76:24 debt to equity split. The debt funding was largely derived from Standard Bank of South Africa that acted as the mandated lead arranger and underwriter. Other debt providers are Liberty Group, DBSA, Futuregrowth Asset Management, and Old Mutual South Africa. Regulations prescribed that debt had to be raised from domestic capital markets as is detailed below. The equity participants were Scatec Solar Norway, Old Mutual, Standard Bank, and Simacel Kalkbult. The DBSA significantly funded the BEE equity stake. The financing arrangements for Kalkbult are summarised as follows in Table 4.3:

Table 4.3: Kalkbult Solar Park Financing Arrangements

Financing Type	Term Loan
Transaction Type	New Build
Total Value	R 2 199.80 million
Equity Raised	R 521.50 million
Gearing Ratio	76:24

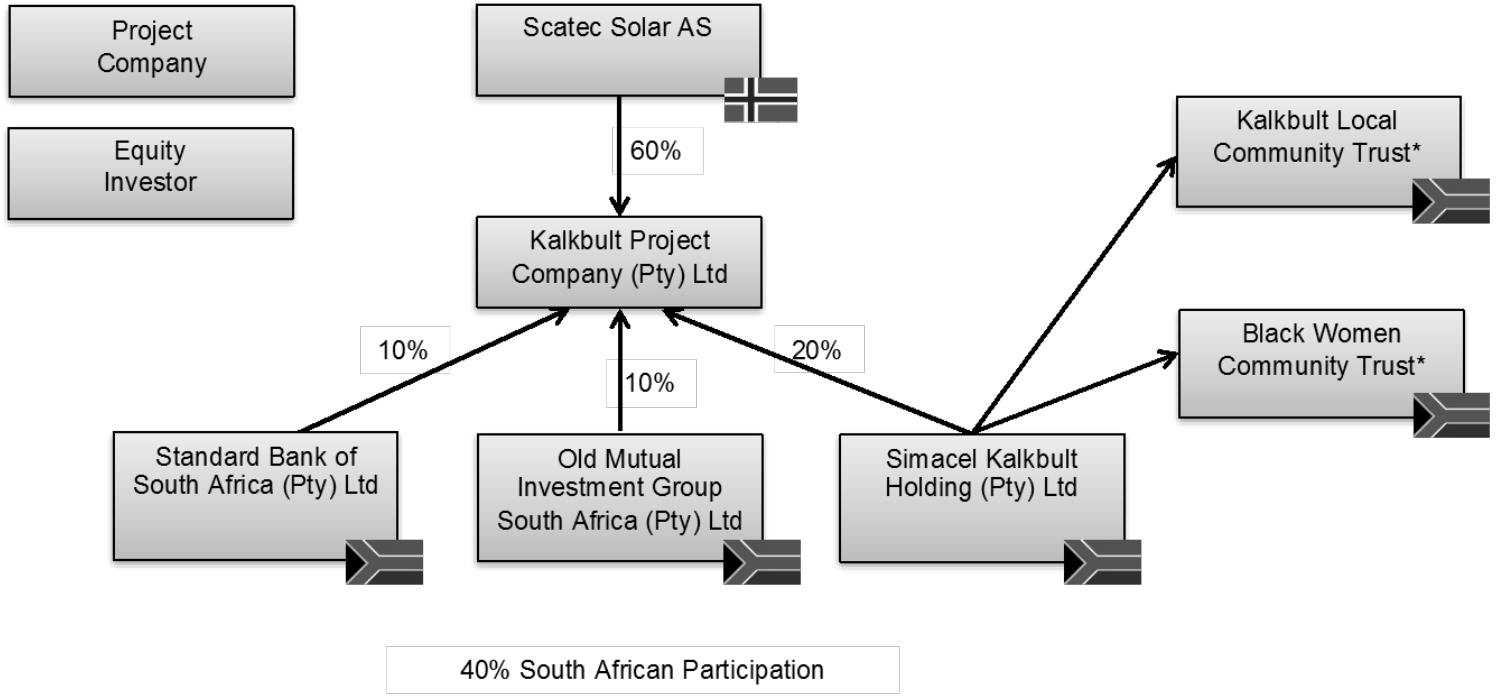


Figure 4-2: Kalkbult Photovoltaic Solar Plant Participants (Scatec Solar: Kalkbult Project, 2012)

The project debt has a term of 15 years. This actually results in a 5-year buffer for the project lenders to have recouped their capital before the concession expires. A conservative appraisal of the capital expenditure reveals that in excess of 55% of these payments would accrue to non-South African equipment suppliers largely in the form of the PV modules. The project cost breakdown reveals transaction costs constitute approximately 3.1% of the capital expenditure costs. If however the DoE Contribution, the Department Premium, and the Commitment Fees Paid are considered as transaction costs, this escalates the latter to 10.8%. This observation highlights the high transaction costs experienced in most project finance transactions.

4.4.3 Key risks

Regulatory and environmental

The process followed to implement Kalkbult by way of the REIPPP was characterised by the following key features. The Request For Proposal (RFP) documentation is divided into three categories that prescribe general requirements and rules, qualification criteria, and economic development necessities. This first stage acts as a basis of communicating clearly and transparently the process to be followed in the auction, the obligations of prospective bidders, and minimum participation requirements to be eligible as a bidder. The second stage seeks to whittle down the applications received to those that most comprehensively and competitively meet the expressed qualification requirements. The preferred bidders are selected based on their submissions on environmental and land matters, economic development proposals, the financial model, technical merits, price competitiveness, and their organisational and institutional capacity. The final stage involves a comparative assessment where preferred bidders are ranked based on price, jobs created, local content levels of equipment, black economic empowerment credentials and community participation, enterprise and socio development. The evaluation process places a 70% weighting to the price bids whilst the remaining 30% is assessed on other development related objectives. On official selection Kalkbult as a winning bidder signed an implementation agreement with the government and a power purchase agreement (PPA) with state electricity utility Eskom. Each winning bidder is referred to as an Independent Power Producer (IPP). The completion of legal agreements result in the South African government guaranteeing the PPA through what is referred to as a Government Support Framework Agreement.

Regulatory requirements prescribe that all debt funding must be sourced from domestic banking institutions or capital markets. Each bidder is also required to lodge a guarantee of R 100 000 per MW with the amount being increased to R 200 000 when a bidder achieves preferred bidder status. Guarantees are forfeited if a bidder is disqualified from the program or breaches any applicable laws, or fails to sign the PPA, Implementation Agreement, Direct Agreement, and Connection Agreement within a specified time. Changes in the ownership arrangements are prohibited for three years after submission of a bid response to discourage speculative bidding. Subsequently these may take place only with the express permission of the Department of Energy. Similarly over the duration of the concession, no changes in control of the IPP are allowed without the prior written consent of the Department of Energy. Any changes in the shareholding by Black Enterprises or Black Persons may only be transferred to other Black Enterprises or black persons.

Solar energy has few environmentally adverse side effects. The most pressing include land use competition where sites can be used for alternative purposes such as agricultural activity. The manufacture and operation of solar equipment results in certain toxic chemical by products. Furthermore the production of PV modules is extremely energy intensive. Aesthetically solar power can be an intrusive and scarring feature of the natural and built environments. During the construction and demolition phases solar power may result in certain levels of noise intrusion, whilst during planning construction and operation there may be some impact on the surrounding ecosystem, flora and fauna. Kalkbult's environmental strengths included the fact that the project would have marginal environmental impact on the site upon which it is located. This is because the site is located in a remote area of the Northern Cape, and the land is only suitable for occasional grazing. The construction of the project allowed for continued grazing, and the farmers from whom land was leased enjoy rental income over the project's duration. Of the 16 comments received regarding the environmental impact assessment in the public participation process, none were negative and no objections were received opposing the venture. The Kalbult plant connected seamlessly to the national transmission grid due to an existing connection in close proximity to the site further limiting the environmental footprint.

Community resistance

The inclusion of the community trust and women's empowerment group was a key feature in financing the transaction and in also adding to the legitimacy of the project. From a local economic development perspective

the project sponsors began working with communities before the RFP. This included sponsoring learning and sporting equipment for Hays Primary School that served the local community, together with the Mamelani Project that focused on youth health care education, subsistence farming skills, HIV training, and a living skills program. In its submission Scatec highlighted its skills development and training facilities in previous projects. This was supported by the forecast that the Kalkbult project would generate 450 jobs during the construction phase and 12 permanent jobs would be created when fully operational.

Construction and technology

The physical construction of the plant took 10 months and was completed 3 months in advance. Despite this the project director conveyed that every one-month of execution required two months of planning time. The project sponsors managed construction risk by commissioning the engineering, procurement and construction of the plant by way of a tender and turnkey contract. Scatec as the major sponsor was able to bring extensive international experience into these negotiations, particularly in the procurement of major hardware. The design, manufacture and installation of the fixed racking system were also secured by way of a tendering process culminating in a turnkey arrangement. Technologically the sponsors opted for tried and tested solar modules, inverter systems, and substructures, limiting capital expenditure, mitigating technology risk, and ensuring the project was bankable. On account of the large surface area covered by the plant a decentralised inverter system was designed and deployed by Scatec. Electricity of 204 W per panel is fed into 84 inverter hubs distributed across the site and collectively stepped up to 22 kV. Each inverter hub then feeds its power into the site's substation where the power is further boosted to 132 kV before being fed into the grid. This system is monitored and managed via 1 500 sensors that transmit real time data to an on site control room and remotely via a dedicated internet based communications link.

Energy yield

The energy yield that could be harvested from the sight was corroborated using internal knowledge within Scatec and comparing this with independent third party sources. This allowed the sponsor to determine a predictable power output with solar irradiation levels at the project site forecast at 1935 Kwh/kWp. As a result of the predictability of the radiation,

equipment providers were more read to issue performance guarantees mitigating against performance and technical risks.

Market

The market risk was mitigated by the PPA signed between the project company and Eskom. The PPA obliges Telkom to purchase all the electricity generated at pre-determined prices. The PPA is effectively underwritten by a sovereign guarantee in the form of Government Support Framework Agreement. The South African government enjoys and investment grade credit rating.

Foreign exchange

Notable characteristics of the REIPPP relative to other parts of the world include the prescription that debt funding must be sourced directly in South African capital markets and are rand denominated. This diminishes foreign exchange exposures by matching interest payments to the currency of the PPA. In addition it results in interest payments remaining in the domestic economy and not being repatriated off shore that could have potentially exacerbated South Africa's current account deficit. International project sponsors are free to hedge exchange rate risk exposures on repatriated profits at their own cost. The pricing of this hedging made it prohibitive for the project sponsors and naked foreign exchange risk was taken.

Interest rate

Naked interest rate risk was taken on the project debt facility, with a floating rate linked to the prime rate of interest. The tariff increments that are in part determined by the inflation rate give some protection to this exposure.

4.4.4 Institutional and legal requirements

Principal contracts

The principal contracts in the Kalkbult project were the Power Purchase Agreement (PPA), the Implementation Agreement (IA), the Direct Agreement (DA), and the Connection Agreement (CA). The PPA was essential in providing a certain off-take to the project sponsors and debt providers. It enabled clarity regarding cash flows and revenue streams if the project performed in accordance with forecasts. Having an effective

sovereign guarantee strengthened the PPPA immensely. The Implementation Agreement was signed between the IPP and the DoE and put obligations to the IPP to deliver economic development targets. The DA gave step in rights for lenders in the event of default by the sponsors. The CA was signed between Eskom and the IPP and laid down the process and costs to be incurred for each project to be connected to the transmission grid. As a collective these contracts were essential in providing a stable regulatory framework, adequate safeguards for participants, and encouraging a competitive bidding process.

Auction process

As with many countries implementing renewable energy programmes, South Africa has adopted an auction system as opposed to a descending clock system, to select winning bidders and prescribe the renewable technology to be adopted. Renewable energy auctions have grown in popularity with the number of countries applying this method increasing from 9 in 2009 to 44 by 2013.

4.4.5 Lessons learned

The development, construction, and commissioning of the Kalkbult has been notable for its speed, stakeholder inclusiveness, scale, and overall success. Arguably the two most important contributors are the REIPPP and the capability of the developer in effectively commercialising the plant opportunity. Promoters of REIPPP expressed how well structured and unambiguous the programme is. It provides certainty around the capacity that will be made available, timelines, the tariff structures, the funding models, technology, environmental processes and compliance requirements. Participants observed the program “forces closure” regarding whether a developer’s project is going to proceed or not. Front loading the major building blocks to a bid including sources of funding, legal and regulatory permits, equipment specifications, EPC providers allows projects to move rapidly into construction if it is successful bidder.

The REIPPP has not been without its detractors. The clarity and certainty lauded above compelled developers to put in upfront an extensive amount of work and investment to ensure compliance with a range of requirements to be eligible to bid. These costs often amounted to 10% or more of the entire capital expenditure for the project. These upfront costs created insurmountable barriers to entry for a number of potential bidders. The authorities have taken note of this criticism and have implemented changes in Round 4 of the program and back-load a significant proportion

of these costs. Approximately 70% of the due diligence work is performed pre-bid with the remainder on the successful award. Another criticism relates to the gaps of approximately one year between each bidding round. The extended gap between each round meant there was often a sense of “starting from scratch” as the lessons of previous rounds were not necessarily embedded and institutionalised amongst the various stakeholder and had to be re-taught. Another area of potential improvement is the level of local content in the capital equipment as significant portions of the capital equipment having to be imported.

A key factor in Kalkbult’s success was the developer’s realistic expectations regarding the IRR expectations, together with the competitiveness of the funding package. The funding package was essential to the project because in an auction system the key driver is cost of debt so if you can reduce the cost of funding you can reduce the tariff and win, because there isn’t massive differentiation in equipment performance and price. International developers with strong balance sheets enjoyed a comparative advantage in some cases by funding entire projects with equity or having a very high equity component relative to debt. Alternatively they were able to issue guarantees and other credit enhancements to local banks providing debt capital to reduce the cost of debt funding. The reputation of the Norwegian developer Scatec and its proven capability in developing solar projects was a key contributor to the success of the bid. This experience also meant the developer was able to source effective EPC contractors with an understanding of risk allocation mechanisms, and who would be able to deliver on their contractual obligations.

The mandatory sourcing of debt from domestic capital markets and the rand denominated tariff on the PPA reduced the attraction of the programme to a minority of international developers who preferred a hard currency denominated tariff. This requirement had the positive effect of creating a natural currency hedge between the PPA and the debt funding. The downside for the developer and other foreign investors who would need to translate dividend distributions into the Euro, Dollars or other alternative currencies was that they were exposed to rand dollar exchange rate volatility. By way of illustration the Rand/Dollar exchange rate fluctuated from US$1:R8.01 to US$1:R10.86 from the project’s award of preferred bidder status to 27 November 2014. This volatility represents a real depreciation of in excess of 35% and has resulted in dollar equivalent dividend distributions being compromised to the same degree.

Prescribing domestic debt funding arrangements in projects such as Kalkbult has had a number of significant benefits for the South African economy. Firstly it has provided a platform for local banks to be at the forefront of the debt issuance activities and not be overshadowed by larger international banks with deeper and cheaper sources of capital. In so doing South African banks have broadened and deepened their skills and human capital in the project finance space in general, and in the renewable power sector in particular. The skills accrual has had a multiplier effect on other professional service providers including auditors, EPC contractors, legal firms, environmental consultants, and other professionals across the development chain.

Appetite for equity stakes by domestic institutional investors was moderate on account of a number of factors. Firstly SA institutions were not experienced with investing in renewable energy as opposed to international developers who had extensive track records. As such institutions that did invest tended to spread their equity exposure across multiple projects to diversify risk. Old Mutual for example took a 10% equity stake in Kalkbult but had multiple equity exposures in other projects as well. Challenges were also encountered with the funding for the BEE equity stakes with ultimately the DBSA and the IDC funding the majority of the latter. The prescription for communities to be included in the BEE schemes has proven a significant benefit to the communities in which projects are developed. The Kalkbult sponsors front-loaded some of the benefits to the local community in the form of education, training and employment opportunities, enabling the venture to garner community backing. The Kalkbult project company has benefited by having access to a better-trained workforce and immunising itself from sabotage.

The success of the Kalkbult and other renewable energy projects has the potential to broaden South African capital markets. Respondents noted how refinancing of the debt would be the most immediate opportunity as the loans can be packaged into an instrument and sold off to yield funds at a margin. Appetite is expected to be strong as the projects will have a proven operational track record and are underpinned by the PPA inferring the debt has sovereign credit rating attributes. It is anticipated that investors with appetite for property funds] will potentially have appetite for power projects such as Kalkbult once a certain critical mass is reached, that is likely to result in the establishment of an additional asset class.

A number of lessons and opportunities to enhance the execution of future REIPPP rounds and to spread the benefits of the programme are proposed. The first opportunity relates to South African company's ability

to sell services in other parts of the African continent where energy and infrastructure related programmes are being rolled out. It is submitted that credit guarantees and enhancements on projects may currently be overly onerous and can be lightened, whilst still being comparable with international benchmarks. Greater clarity regarding the exact roles of NERSA and the DoE are proposed as conflicting interpretations have occurred regarding the responsibilities of each of these institutions. Another potential improvement would be for a debriefing session post bidding for unsuccessful developers, supplementing the letter currently received, and facilitating engagement as to remedies that developers can make to their bids for them to be more competitive. In response to dumping of equipment, a submission to the effect that anti-dumping mechanisms should be introduced including imposing minimum technical criteria on imported equipment. Finally the standardisation of contractual documentation in the bidding process is an intervention that has the potential to significantly ease the extent of front-loaded development costs.

4.5 South Africa Country Cluster Comparison

A comparison of the four case studies investigated in the South African cluster reveals a number of pertinent insights. Firstly, the depth and the liquidity of South African capital markets allow for large pools of capital to be sourced and applied towards large infrastructure projects. All debt and equity funding for the three projects was sourced from within South Africa, with the only exceptions being the 23.75% foreign owned equity portion of Seacom, the 5.51% contribution by international partners to the PBMR, and Scatec's 60% equity contribution to Kalkbult. Significantly, the South African government was key to underwriting The Gautrain, PBMR, and Kalbult either directly or indirectly through state owned enterprises or related government institutions. Without state financial participation and related facilitation these ventures would not have been commissioned. The deterioration in the South Africa's sovereign deteriorating credit rating from A- in 2011 to Baa2 in 2015 by Moody's implies that the state is less well placed to underwrite large scale infrastructure projects. Debt funding from commercial banks was accessed for the proven technologies applied in Seacom, the Gautrain, and Kalkbult. Debt funding could not however be applied to a FOAK technology that was the PBMR.

The nature of government participation also differed significantly across projects. With public initiatives such as the Gautrain and the PBMR extensive, detailed and pro-active participation by national, provincial and municipal levels of government, and government agencies were required to

facilitate the projects. Regarding Kalkbult, national government contributed by conceptualising and implementing a clear and credible regulatory framework, and underwriting the REIPPP by way of a sovereign guarantee. Due to the Seacom cable being located largely in international waters and the nature of the project, state participation was largely limited to regulatory aspects.

The Seacom, Gautrain, and Kalkbult stakeholders made extensive use of technical, legal, and financial advisers, together with international service providers where required. The participation of international advisers on the other projects appears to have contributed to more robust and well-conceptualised projects that outweighed the costs of these services. A notable aspect of the PBMR is the limited input of the international partners in the technical and operational affairs, and absence of external advisers. This may have been in part due to the fact that the project had a significant exploratory aspect, or sensitivities concerning intellectual property. The absence of external input on the PBMR appears to have resulted in the venture being more insular and less subject to oversight and monitoring especially on the technical development.

The term horizons for the project sponsors reveals marked differences. The sponsors on Seacom were committed to the project for its full life whilst the Gautrain has commitment from the South African government in perpetuity. The shareholding in Kalkbult cannot change without regulatory approval. In contrast, the commitment of the South African government as the 100% shareholder of the PBMR was never explicitly articulated and evidently uncertain. This ambiguity by the sole project sponsor undermined the project's credibility. The capital structures of Seacom the Gautrain, and Kalkbult post completion have evolved in accordance with the forecast funding model and been conservative in nature. Conversely the funding model for the PBMR was never clarified and the capital structure was largely determined by the generosity of government allocations decided on an ad-hoc basis. While the governance arrangements on the Gautrain are clearly instituted by way of the GMA, and in the case of Seacom and Kalkbult by way of a shareholder agreement, the PBMR governance arrangements were never made final, and executive responsibility shifted between DTI, DPE, and DoE, with on-going reservations by treasury officials. The cases illustrate that the stability and clarity in the governance arrangements are a clear component contributing to project success.

For all four projects investigated no significant breaches of sustainability regulations were noted. In the case of the Gautrain, and to a lesser extent Kalkbult, this can be attributed to the authenticity of the EIA and EMP

despite a number of imperfections in this respect. Regarding Seacom, the undersea cable has a small environmental footprint and key risks can be mitigated and addressed in the EIA process. The Seacom sponsors would also have been careful not to risk jeopardising the entire venture based on a sustainability breach at one location alone. The failure to construct a prototype of the PBMR ensured environmental impacts were limited to the conceptualisation and research phase. On all four projects no risks outside of the risk universe mapped out at conceptualisation have occurred that have not been mitigated. Unanticipated risks have included cable theft on the Gautrain and political upheaval in Egypt and piracy off the Somalia coast that resulted in cable connection delays for Seacom. The risk universe has largely been stable and predictable with the exception of the Egypt and Somalia occurrences that were effectively addressed.

As at June 2015 the Gautrain, Seacom and Kalkbult projects post completion, are mature and stable. Additional rolling stock is being procured for the Gautrain to increase capacity as patronage as exceeded original forecasts. A feasibility study to extend the network is expected to be complete by the end of 2015. The Seacom venture is building on its backhaul and value added services. Importantly the business landscape has changed dramatically due to new entrants and significant declines in bandwidth prices necessitating an adaptive business model. The stability of the Seacom project has allowed the sponsors to refinance the debt facilities on more favourable terms. The Gautrain debt component can potentially be favourably refinanced with bankers expressing keen appetite for this, together with extending further advances for the next stage of the project assuming the successful outcome of the feasibility study. Table 4.4 distils some of the key comparative attributes between Seacom, Gautrain, the PBMR, and Kalkbult contrasting key contributors to success and failure.

Table 4.4: South Africa Cluster Comparison

Attribute	Seacom	Gautrain	PBMR	Kalkbult
Geographic Source of Funding	• Debt funding all South Africa • 76.25% equity funding South Africa	• Debt funding all South Africa • 100% equity funding South Africa	• 100% equity funding South Africa • International partner contribution equivalent to 5.51% of project costs	• Debt funding all South Africa • 60% international equity funding. • 40% equity funding South Africa
Nature of Equity Participants	• Private sector investment funds	• Provincial Government	• National Government	• Private sector investment funds and community groups
Government Participation	• No government participation except on regulatory matters	• Extensive participation by National, Provincial, and Municipal tiers of government	• Extensive participation by government via Eskom, NER, DoE, DPE and NT	• Participation by government via Eskom, NER, DoE, and NT. Drafting of REIPPP regulatory framework
Debt Funding Institutions	• SA Commercial Banks	• SA Commercial Banks	• Not applicable	• SA Commercial Banks
Use of International Service Providers	• Extensive use of technical, legal, and financial advisers • American promoter and equity participant actively involved • International service providers commissioned to roll	• Extensive use of technical, legal, and financial advisers by all participating stakeholders • Rolling stock sourced from international rail groups • Operating company led	• Insignificant participation by international partners • Limited financial contribution by Exelon and Westinghouse • No operational involvement by Exelon and Westinghouse	• Extensive use of technical, legal, and financial advisers by all participating stakeholders • Equipment sourced from multiple jurisdictions • Operating company led by Scatec

Attribute	Seacom	Gautrain	PBMR	Kalkbult
	out infrastructure	by international service providers		
Time Commitment of Sponsors	• Long term and open ended	• Perpetuity	• Undefined	• Long term over 20-year concession. Regulatory approval required for changes
Project Stage	• Initial project concept mature and stable • Scope of project extending to downstream backhaul operations and value added services	• Initial project concept mature and stable • Extension of rolling stock assets to fill elevated demand • Feasibility study on network extension to be finalised in 2015	• Project mothballed • Administrative being performed to register and manage intellectual property arising from project	• Initial project concept mature and stable
Business Landscape	• Sector experiencing significant changes including new cable entrants, technological advances enhancing performance of existing infrastructure, massive drop in prices, huge volume increases • Evolving business model from IRUs to annuity income	• Challenges and delays regarding the implementation on Provincial Highways reduce economic appeal • Growing demand due to increased congestion • High barriers to entry and international standard make service offering very attractive • Affordability of service limited to middle class patrons	• Nuclear technology being challenged on account of massive cost overruns on recent projects • Fukushima leakages due to tsunami in Japan have raised nuclear safety concerns • A number of countries including Germany have suspended construction of nuclear power plants	• REIPPP in round 4.5. Increasing competitiveness in bidding and significant drop in prices.

Attribute	Seacom	Gautrain	PBMR	Kalkbult
Capital Structure Post Completion	• No significant changes and conservative leverage adopted	• No significant changes and conservative leverage adopted as largely funded from public purse	• Not applicable – project mothballed	• No significant changes
Governance Structure Post Completion	• No significant changes	• No significant changes	• Not applicable – project mothballed	• No significant changes
Significant Environmental/Sustainability Incidents	• Non reported	• Non reported	• Non reported	• Non reported
Risk Universe Dynamics	• Stable and well managed	• Stable and well managed	• See 'Competitive Business Landscape' above	• Stable and well managed
Refinancing Initiatives	• Successful refinancing of original debt facilities	• Refinancing being considered but not yet effected	• Not applicable – project mothballed	• Non reported

Mozambique Cluster

4.6 The Mozambique Aluminium Smelter (Mozal) - Phases I and II

FACT SHEET	
Project Description	▪ Construction and operation of a two phase aluminium smelter ▪ Development of Matola harbour facilities servicing smelter import and exports
Key Personnel	▪ Brian Gilbertson – Chief Executive Officer – BHP/Gencor ▪ Paul Snyman – Financial Director – Alusaf (BHP/Gencor) ▪ Louis Irvine – Treasurer - Alusaf ▪ Jaco Kriek – Head of Project and Structured Finance – Industrial Development Corporation
Contractors	▪ Murray and Roberts and S&C Love – Engineering, Procurement, Construction ▪ Pechiney – Aluminium Pechiney AP30S state of the art smelting equipment and related technology
Objectives	▪ Kick-start Mozambique industry and economy (impact on GDP and export earnings) ▪ Demonstrate Mozambique's receptiveness to foreign direct investment ▪ Optimise Cahora Bassa power station and excess electricity generation capacity in Southern Africa ▪ Create forward and backward industrial linkages via industrial park, Hillside Smelter in SA, and Maputo Corridor ▪ Enhance greater regional co-operation ▪ Socio-economic impact: job creation, quality of life, community development, fight poverty
Funding and Shareholders	▪ Full funding requirement – US$ 2.3billion (Phase I – US$ 1.34 billion; Phase II – US$ 992 million) ▪ Project debt US$ 1 060.6 million non-recourse funding – internationally syndicated (International Finance Corporation subscription of US$ 113.9 million) ▪ Shareholding made up as follows: ➢ BHP Billiton (47%) ➢ Mitsubishi (25%) ➢ Industrial Development Corporation (24%) ➢ Government of Mozambique (4%)
Products and Services	▪ Aluminium ingots ▪ Developed and fully functioning Matola harbour facility at Maputo

4.6.1 Background

Mozambique has suffered a turbulent contemporary history. The country was colonised by the Portuguese from the mid-16th century until 1975 when the Marxist Frente de Libertacao (Frelimo) declared independence. Shortly after independence civil war broke out with a group called the Resistencia de Mocambique (Renamo). In 1992 Frelimo and Renamo signed the Rome Agreement bringing an end to the civil war. Under colonial rule Mozambique's economy was dominated by the agricultural sector and production of sugar, cashew nuts, wood and sisal. At independence the country was one of the poorest countries in the world and remains one of the least developed countries with a human development index of 0.327, life expectancy of 49.5, and per capita income of US$ 1023.9 (Siftung Bertelsmann Transformation Index, 2014). Despite economic growth rates in excess of 7.2% over the past decade Mozambique continues to face key development challenges. The country is endowed with substantial natural resources including coal, gas, hydro-electric potential, arable land, and tourist attractions.

The Mozal project is housed within the Beluluane Industrial Park approximately 17 kilometres south of Maputo and occupies 140 hectares of the park's 660-hectares. Mozal arose out of a confluence of interests of a number of key participants. BHP had developed the Hillside and Bayside aluminium smelters in Richards Bay, South Africa, and noted an opportunity to replicate this success in Mozambique. Due to the close proximity of the envisaged Mozal plant to the Hillside smelter, BHP believed it could derive significant synergies by using existing suppliers, personnel, production techniques, and related operational infrastructure. Mozambique offered access to competitively priced electricity and harbour facilities, and qualified for preferential trade terms with the European Union. Eskom is the largest electricity generation and transmission utility on the African continent. In the 1990s Eskom enjoyed surplus generation capacity and was seeking new markets to sell this surplus. The Industrial Development Corporation (IDC) had participated in the funding of the Hillside smelter and had been mandated to operate beyond South Africa's borders to facilitate industrialisation development and regional economic integration. BHP, Eskom, and the IDC approached the Mozambican government to obtain approval for the planned project. Key considerations in in punting the venture enhanced GDP, balance of payments, budget receipts, employment creation, and socio-economic conditions.

4.6.2 Financial structure

Ownership structure

The shareholders of the Mozal project together with their respective equity stakes are BHP Billiton (47%) a leading resources company and principal sponsor, Mitsubishi (25%) which is a Japanese conglomerate with a significant industrial portfolio making extensive use of aluminium, the Industrial Development Corporation (IDC) (24%) which is a South African development finance institution, and the Mozambican government (4%). The contractual structure and deal arrangements of the Mozal project are illustrated in Figure 4-3 below. Non of the sponsors enjoy sole control over the project based on their equity stake in effect circumscribing any of them from acting unilaterally, particularly BHP. Mitsubishi's significant shareholding was important to embed Mitsubishi as one of the key participants in the guaranteed off-take agreement. The IDC's 24% complies to the latter's mandate of not holding controlling stakes. The remaining 4% held by the Mozambican authorities allows for the project sponsors to advance the argument that the host government is a joint owner, whilst limiting the government's capital contribution. This has the effect of enhancing Mozal's political credibility and enhances the sponsors direct lines of communication to political principals

How the financing was arranged

Due to Mozambique's turbulent political past, general under development, and the absence of an investment grade rating, raising capital for Mozal from commercial banks appeared highly improbable. Reticence was compounded by the fact that commercial lenders had limited experience in transacting in Mozambique. To attract the participation of international banks the International Finance Corporation (IFC) played an essential role. The IFC highlighted that the project would contribute to successful economic reform initiatives, triple Mozambique's exports, add more than 7% to the country's GDP, create jobs, provide extensive training, and include construction and upgrading of key infrastructure that would also be used by other industries. Due to its extensive experience in developing markets, the credibility of the IFC in the evaluation and assessment of risk allayed some of the credit risk concerns of potential funders. The IFC was also perceived as an 'honest broker' by participants including the host government. The IFC was instrumental in aligning the contractual documents with the differing legal systems of Mozambique, South Africa, and England.

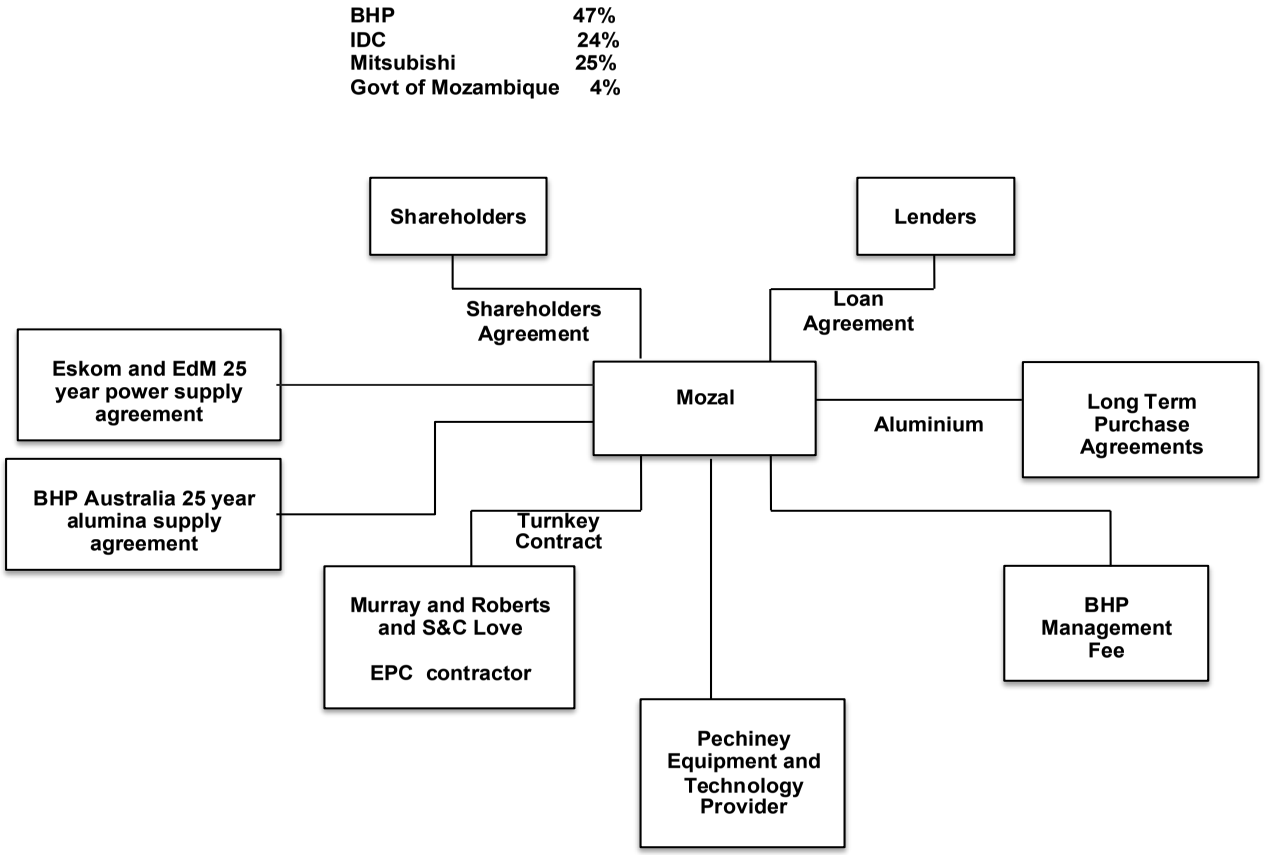


Figure 4-3: Mozal Contractual Structure

This integration supported the drafting of robust and comprehensive contractual documentation that would simplify understanding and reduce disputes. From a loan arrangement perspective, the IFC capital differentiated itself from private sector capital providers with longer tenors of 7 -12 year facilities for the senior debt and 8 -15 year facilities for the sub-ordinated debt. The IFC also extended loans on a sub-ordinated basis. Whilst this exposed it to greater risk, it decreased the risk of the private sector lenders and made the investment proposal more attractive. Finally, the IFC acted as an umbrella against political and sovereign risk. This provided additional assurance that the public authorities would not take any action that would compromise the project.

The financing arrangements for Mozal are best observed over the two phases. The first phase projected total investment of US$ 1.340 billion of which US$ 520 million was financed through equity. This represents a debt and equity contribution to total capital of 61% and 39% respectively. The second phase of the project required an additional capital injection culminating in total historical funding of approximately US$ 2 billion. Of this amount US$ 1.1 billion constituted internationally syndicated non-recourse debt funding. Incorporating both phases results in a debt and equity contribution to total capital of 55% and 45% respectively.

Table 4.5 below presents the scope of debt funders for the combined phases including banks, export credit facilitators, and development finance institutions. These lenders came from no less than 6 countries and 3 multilateral DFIs.

Table 4.5: Mozal Loan Funding (BHP Welcome to Mozal, 2014)

Lenders	Grand Total US$ millions	Country of origin
International Finance Corporation (IFC)	113.9	Multilateral DFI
Commonwealth Development Corporation (CDC)	52.1	Multilateral DFI
PROPARCO	29.6	France
Deutche Investitions und Entwickluingsgellschaft (FEG)	30.7	Germany
Development Bank of Southern Africa (DBSA)	82.5	South Africa
European Investment Bank (EIB)	32.9	Multilateral DFI
COFACE Lenders (agent BNP Paribas)	189.3	France
MOZFUND CGIC/SAECA supported lender	445.3	Multilateral DFI
Japan Bank for International Cooperation (JBIC)	60.2	Japan
Export Development Corporation (EDC)	24.1	Canada
Grand Total	**1 060.6**	

In the first phase the debt was split into two tranches of sub-ordinated and senior debt. The sub-ordinated debt amounted to US$ 150 million of which US$ 65 million was provided by the IFC, and the remaining US$ 85 million obtained from other DFIs. Characteristics of the sub-ordinated debt included a rate of interest with a fixed floor, and a variable component derived from the total sales generated by Mozal. The repayment schedule for the sub-ordinated capital only kicked in at the beginning of the eleventh year of the venture. This arrangement allowed providers of sub-ordinated debt to participate in the upside of the venture. The debt arrangements permitted the deferment of both the base and variable interest payment when the price of aluminium fell below a set price. These arrangements meant that the sub-ordinated debt had 'quasi equity' characteristics The senior debt of US$ 680 million was made viable by the procurement of insurance from Credit Guarantee Insurance Corporation (CGIC) and the South African Export Credit Agency of US$ 400 million that covers lenders for commercial insolvency and political risk such as expropriation, an outbreak of war, contractual breaches, and currency convertibility and repatriation risks. The remaining US$ 140 million tranche on the senior debt was supplemented by DFIs including the IFC. Due to the sponsors combined experience and capability in aluminium smelters they did not make use of external financial advisers. The sponsors built an internally generated financial model, which was credible to lenders, minimised advisory costs, and facilitated rapid progress in moving the project from proof of concept to implementation. The IDC played an essential administrative role in the administration of 380 contracts and co-ordinating disbursement profiles as these had to be effected on a pro-rata basis across multiple facilities. Chase Manhattan acted as the principal international banker for the administration of offshore bank loans and related facilities.

The IFCs participation in the Mozal project was driven by a combination of a developmental and economic intent. The financial return extracted by the IFC was high and correlated to the high-risk assessment of the project. The IFC ultimately generated a "massive return". This return was made accentuated by the fact that the IFC did not share in the overrun and schedule risk, yet benefited from the project coming in below budget. This was an area of contention with the other shareholders who argued that the IFC was benefiting from risks that it did not take, and was accruing a return on the full US$ 150 million quasi-equity facility when in fact only US 130 million of this facility had been drawn down upon. Other questionable characteristics of the IFC participation included the high level of bureaucracy, multiple technical advisers, and onerous transparency and

disclosure requirements. In summary the debt raising was a “difficult process” exacerbated by the number of parties involved, but without the IFC the funding for Mozal would not have reached financial closure.

4.6.3 Key risks

Regulatory and environmental

Part of the package of incentives to enable Mozal by the Mozambican authorities was an exemption from corporate tax (currently levied at 32%) and customs duties, and the application of a 1% levy on turnover. Mozal was supported by an investment protection agreement between South Africa and Mozambique on 6 May 1997. This agreement gave reciprocal protection to investors from both countries to prevent expropriation and other interference from the host government. The project sponsors fostered the active engagement of both governments on the project highlighting the “difference between government support and government involvement”. The sponsors “wanted the support of the South African government…so if the Mozambicans changed their minds after the election…you could impose the agreements that had been reached…it was to deal with the political risk”. The sponsors however differentiated these activities from the respective governments getting actively involved in the project. The thinking in this respect was that seeking excessive government approval on a Mozal would expose it to government involvement and interference that could result in a deviation from the core project objectives. The implementation of Mozal was spearheaded by a very senior person from BHP in Mozambique who interacted directly with the Mozambican government. The first task in these interactions was to manage the linkages on which the project was dependent including restructuring of border procedures, and importation of capital equipment and operational inputs.

The production of aluminium follows multiple stages from extractive, to processing and finally manufacturing and has a sizeable environmental footprint. This includes topsoil removal, deforestation, and changes to the hydrology where the bauxite feedstock is mined. These activities impact on biodiversity and introduce emissions into the environment. The smelter process using electrolysis to produce aluminium is a highly energy intensive method. The electricity used is generated in many instances from fossil fuels including gas, coal, and crude oil derivatives. Aluminium production may therefore be indirectly responsible for the adverse environmental impacts of extracting these energy sources that are not

renewable. Finally, the transportation costs for bauxite, alumina, and aluminium present an additional environmental burden.

The environmental footprint of Mozal was relatively limited and addressed by a comprehensive EIA and EMP. Respondents noted that the IFC standards for environmental and labour were very demanding. The transparency and disclosure regime governing the IFC required a 6-month window period prior to approval to allow stakeholders sufficient time to give input. The environmental compliance aspects were generally regarded as “hygiene” factors that needed to be addressed in order for the financing of the project to be successful. After commissioning these factors were important in ensuring a broad set of stakeholders continued to support the project. Whilst there are no significant acts of environmental breaches in Mozal’s operations, a complaint to the IFC by a consortium of local and national non-governmental organisations relating to potential air emissions during the servicing of Mozal’s equipment in October 2010 was lodged, and resolved. To fulfil their corporate social responsibilities, the Mozal management have participated in a number of community initiatives notably through the Mozal Community Development Trust established in 2001. The mandate of the trust was to invest in projects related to community infrastructure including health, small enterprise development, education, sports and culture. It was furnished with a budget of US$ 2 million per annum at inception and partners other agencies and non-governmental organisations. In 1998 Mozal revitalised the Beloluane Village School that lacked a roof, running water, and electricity. It was restricted to 130 pupils and suffered high levels of absenteeism including 20% due to malaria contraction. After its rehabilitation the school increased its capacity to 700 pupils, extended the grades offered from a ceiling of grade 5 to include grades 6 and 7, and connected potable water and electricity. Measures were also successfully introduced resulting in a dramatic decline in the incidence of malaria and concomitantly, absenteeism. Between 2000 and 2003 an additional 25 classrooms have been built at 6 different primary schools and 3 secondary schools have been built. The trust also provides bursaries for tertiary education. Other social initiatives include the construction of a new police station in Beluluane with four donated vehicles and the construction of a clinic. The responsibility to maintain the schools and other public amenities resides with the Mozambican government. To foster agricultural development Mozal participated in the Machamba government program that targeted 900 subsistence farmers in a 3-year agricultural upliftment project. The results of this intervention were a dramatic increase in crop yields and successful diversification of income from subsistence means.

Construction and technology

A key factor in the conceptualisation of Mozal and the related risk management was the intention to monetise the synergies that would accrue from BHP's experience in completing the Bayside and Hillside smelters. Accordingly Mozal used the same EPC firms (Murray and Roberts and S&C Love), and equipment and related technology providers. 78% of the management team consisted of personnel who executed Bayside and Hillside. Phase I of Mozal took 31 months from receipt of go ahead to the full commissioning of the smelter and came in at US$ 120 million below budget, and 6 months ahead of schedule. Phase II of Mozal took 26 months from receipt of the go ahead to the full commissioning of the extended smelter and came in US$ 195 million below budget. Both phases were completed comfortably within the deadline dates and performed in accordance with specifications. The EPC contractors were incentivised to complete the plant expeditiously to enjoy early completion bonuses.

Inputs, feedstock, and operational

The major operational costs in Mozal related to alumina, electricity, labour and other raw materials. To hedge against fluctuations in the alumina price which represented 33% of production costs, a long term agreement that derived the price of alumina from the spot price of aluminium on the London Metal Exchange was entered into with BHP's Australian operations. Electricity represented 25% of production costs and a 25-year electricity supply agreement between Mozal, Eskom and Electricidade de Mocambique (EdM) stipulated the electricity price would also be derived from the aluminium price. Skilled and experienced labour was sourced from BHP's South African operations, whilst lower skilled labour was obtained from the local population. In order to secure an experienced and highly skilled management team a management contract securing the services of key management personnel from BHP was signed based on an incentive structured fee arrangement, further aligning their interests in the project. To enjoy the tax benefits expressed in the regulatory section, Mozal was located in a designated industrial zone.

The operational parameters at Mozal prescribed that the plant operated on a 24-hour basis and could not be without power for in excess of two hours. To ensure electricity of supply, a special purpose vehicle called Mocambique Transmission Company (MOTRACO) and jointly owned by Eskom, the Swaziland Energy Board and EdM was established. MOTRACO was provided two independent electricity lines to Mozal with

the first line from South Africa directly into Mozambique. The second line went from South Africa, through Swaziland, and finally into Mozambique. Having two independent lines mitigated against the risk of plant redundancy in the event that a single line was disabled due to sabotage or other events. The power contract between Mozal and Eskom was renegotiated in 2010 and denominated in South African rand. Part of the logic informing the renegotiation was Eskom's surplus capacity having become a deficit in the years subsequent to the commissioning of Mozal, and the greater reliance of the plant on electricity from the Cahorra Basa hydroelectric dam in Mozambique.

Market, foreign exchange, and commodity risk

To address market/demand Mitsubishi and BHP entered into a long term dollar denominated purchase agreement with the project company for the full output of the plant at market related prices. Mozal was managed as much as possible as a dollar based venture despite a significant portion of costs being denominated in South African rands. The cost of key inputs and outputs including alumina and aluminium were denominated in US dollars. In addition the electricity price was derived from the aluminium price which resulted in a natural hedge between the output price received and the second largest input cost. These initiatives established natural hedges on commodity and foreign exchange risks with a key consideration being all debt principal and interest repayments were denominated in US dollars. Operational expenditure such as consumables were left unhedged. Unhedged rand exposures included the construction costs to Murray and Roberts and S&C Love, together with the related materials that were imported from South Africa. The EPC contractors were immunised from settlement risk by the pre-arranged finance.

Credit

When the IDC began looking at the prospects for the Mozal project, international capital markets were effectively closed to Mozambique and This isolation could be attributed to the civil war, Marxist policies pursued by the Frelimo government after independence, and the country's poor fiscal situation whereby a significant portion of its budget was derived from donors. Mozambique was perceived as impoverished, dangerous, risky, backward, and having limited business prospects. At that time Maputo had no more than two hotels of international standard whilst road infrastructure was dilapidated and electricity distribution erratic or non-existent.

It was essential to get the participation of the IFC to attract other international financiers. The project developers also actively sought to get as many financial institutions to participate as possible as increased numerical participation added to the credibility of the project and enhanced its investor appeal. South African involvement in the transaction including BHP and Eskom helped to draw parties into the arrangement. To entrench IFC participation and support it was opted to use the Multilateral Guarantee Agency (MIGA) which like the IFC is a member of the World Bank Group, to provide political risk insurance as opposed to the South African Export Credit Insurance Company (ECIC). Due to the number of parties involved, the transaction ended up becoming a complicated consortium involving approximately 20 banks, and the draft agreement contained 183 conditions precedent. The final funding agreement was signed just before midnight on the 30 June 1998 expiry date. The IFC played a critical role co-ordinating and securing support across debt and equity participants. The project team for the Mozal Aluminium Smelter was only formalised with the approval of the US$ 50 million facility from the IFC setting it up as a serious project having moved from proof of concept stage to implementation. Because the Mozambican banking system was characterised by shallow capital pools, illiquidity, and lingering questions regarding its integrity and stability, all bank accounts for Mozal were held in dollarized offshore accounts.

Political

As highlighted above, the debt capital providers and sponsors took out political risk insurance on Mozal via MIGA. Other developments leading up to the implementation of Mozal reflect the evolving political risk dynamic. Firstly the Mozambican government had made a decisive resolution to discard a fundamentalist pursuit of Marxist ideology and adopted pragmatic economic reforms. The Mozambican government's intent in facilitating Mozal was for the project to act as a flagship to build credibility as a serious investment destination. Accordingly it was willing to offer generous concessions that signalled an improvement in political risk. Secondly the Southern African Development Community (SADC) was gaining greater cohesion as an economic block. Mozal's thrust to purposefully create mutually beneficial linkages in SADC re-enforced the participating governments support including political principals such as Presidents Chissano and Mbeki. Bottlenecks and bureaucracy that could have compromised the project were effectively addressed. The IPA signed between South Africa and Mozambique also increased the confidence of investors in the project. Mozambique's reliance on international donors

including the World Bank for a significant portion of its national budget, enabled the IFC to enjoy a political umbrella, and mitigate against untoward political interference. Finally, the Mozal project was attractive to the Mozambican and South African governments, and international development finance institutions on account of the massive economic impact it would have, and the broader social impact and development potential.

4.6.4 Institutional and legal arrangements

The key contracts in the Mozal project were 25 year power supply agreement with Eskom and EdM, 25 year alumina supply agreement with BHP Australia, the turnkey construction contract with Murray and Roberts and S&C Love, the equipment and technology contract with Pechiney, the BHP management contract, the long term purchase agreement with Mitsubishi and BHP, the loan agreement, and finally the shareholder agreement. The role these contracts played in enabling the project, and their key features have been highlighted in the sections above.

Due to significant French participation and funding on the project, drafting the contracts in accordance with French law was considered. A number of participants registered reservations on account of their unfamiliarity with the latter. Capital providers were unfamiliar with Mozambican law, which in a number of respects lacked the relevant statutes, regulations and depth of case law to adjudicate commercial transactions of the nature, scale and scope of Mozal. In addition, the Mozambican courts record of independence and expeditiousness was of questionable repute. It was also clear that most capital providers would not have agreed to the application of South African law. As a result, all the underlying contractual arrangements were drafted in accordance with English law with legal recourse premised on English courts. The project developers commissioned Mozambican counsel in respect of key areas such as those relating to security and mortgage bonds on the transaction to ensure there was no inadvertent conflict with domestic laws and regulations.

4.6.5 Lessons learned

Perhaps the most important lesson from Mozal is the evolving nature of political risk. The first phase of the project required a large consortium of investors, extending the time it took to reach financial closure. The terms and conditions demanded from the project company were onerous. By the time the second phase of the project was executed, the perception of political risk in Mozambique had changed dramatically and positively. The

terms of the financing in phase 2 of the project were comparatively much more favourable, and the transaction easier to close. The financial arrangements for Mozal also differed significantly from similar arrangements in developed markets. This occurrence gives a hint as to how capital structure formulation in Mozambique may be unique, and the relative applicability of the main capital structure theories in Sub-Saharan Africa, that will be discussed in chapter 6.

The second lesson is that in countries such as Mozambique, the investment case may need to be looked at holistically, and include not just the envisaged operational plant, but also enabling logistical infrastructure including roads, harbours and ports. Without these, many potential projects remain unrealisable. Whilst the project developers actively engaged with the Mozambican and South African governments in the project execution, they managed to strike a correct balance, which limited direct government participation in the project, and unwanted government interference. The project developers enjoyed significant budget and time completion gains by making use of an experienced team that had recently executed similar projects. Corporate and institutional memory, human resources, and intellectual property may be a factor contributing to project success and failure that is not given due regard.

Despite the objectives of the project being clearly spelt out and agreed between stakeholders including the Mozambican and South African governments, the project faces significant criticism particularly regarding the extent to which socio-economic benefits have trickled down to surrounding communities. This is in spite of the project developers seeming to have fulfilled all their socio-economic development obligations. The lesson here is that with large, highly visible ventures, it is likely to be extremely difficult to manage expectations, particularly from the public, but also other stakeholders including non-profit organisations, community groups etc.

4.7 Sasol Natural Gas Project

	FACT SHEET
Project Description	▪ Exploration and development of Temane/Pande gas field - Mozambique ▪ Construction of gas central processing facility - Mozambique ▪ Construction of 865 kilometre cross border pipeline – South Africa and Mozambique Conversion of Sasol network – South Africa
Key Personnel	▪ Pieter Cox – Chief Executive Officer – Sasol ▪ Hans Naude – Managing Director – Sasol Gas ▪ Elmore Marshal – Sasol Sponsor ▪ Beno van Waveren – Project Manager – Sasol Natural Gas Project (Central Processing Facility)
Contractors	**GLMC Consortium** ▪ Grinaker-LTA (South Africa) – Engineering, Design, Procurement, Construction ▪ McConnell Dowell (Australia) – Engineering, Design, Procurement, Construction ▪ CCIC (Lebanon) - Engineering, Design, Procurement, Construction **Europipe and Itochu Consortium**– Pipe Supply Contract ▪ Europipe (Germany) ▪ Itochu – (Japan) ▪ Hall Longmore (South Africa) ▪ Kawasaki (Japan) ▪ Salzgitter (Germany) ▪ Foster Wheeler – Engineering, Design, Procurement,
Objectives	▪ Construction of commercial gas extraction and processing capacity. Development of pipeline and related transportation infrastructure to get gas to market ▪ Promoting empowerment of indigenous population ▪ Developing Southern African gas industry and enhancing regional economic integration ▪ Environmental emissions improvements by substituting alternate fossil fuels for gas ▪ Diversification of energy sources ▪ Contribute to infrastructure development through development of roads and removal of landmines
Funding and Shareholders	▪ Full funding requirement – $1.2 billion (Gas field development and Central processing facility – $ 330 million; Gas Pipeline – $ 605 million) ▪ Project debt $ 540 million non-recourse funding – internationally syndicated (International Finance Corporation subscription of $ 10 million) ▪ Major equity participants made up as follows: ➢ Sasol ➢ Government of Mozambique ➢ Companhia Mocambique de Hidrocarbonetos ➢ Empresa Nacional de Hidrocarbonetos de Mocambique ➢ International Finance Corporation ➢ CMH ➢ South African Gas Development Company

4.7.1 Background

In the year 2000 the Mozambican government in conjunction with a number of international companies prospecting for hydrocarbons in the country, announced the discovery of sizeable natural gas deposits. The gas fields were discovered in the Rovuma Basin off the coast of Cabo Delgado Province, and in the Mozambique basin that spans an area that is both onshore and offshore in the Inhambane and Sofala provinces. These fields were adjudged to have 2.7 tcf that equated to a lifespan of 25 years (Gqada 2013). Four petroleum-licensing rounds, resulting in exploration blocks being allocated in 11 areas, followed the discovery. In accordance with a clause in the Petroleum Law 3/2001 the state reserves the right to participate in all concessions by way of a 100% state owned company Empresa Nacional de Hidrocarbonetos de Mocambique (ENH).

The Sasol Natural Gas Project (SNGP) is a triple tiered development consisting of three core activities including gas extraction and purification at a central processing facility in Mozambique, transportation of gas by way of a pipeline to an industrial hub in South Africa, and the utilisation of the gas as a feedstock in value added petrochemicals manufacturing at the Sasol plant at Secunda, with residual sales of excess gas to other industrial and retail consumers. The project involved the drilling and development of the Pande and Temane gas fields located in Mozambique's Inhambane Province and with commercial gas reserves of approximately 2.7 tcf. Complementing this extraction process is a Central Processing Facility (CPF) located in Temane to clean and purify the gas prior to transportation. The second tier of the project involved the construction of an 865 kilometre underground pipeline spanning both Mozambique and South Africa to transport the gas to a Sasol owned industrial hub in Secunda, South Africa. The Mozambican route of the pipeline extends for approximately 520 kilometres running from Temane to the South African border at Ressano Garcia. Five take off points were embedded into the pipeline at Ressano Garcia/ Maputo, Magude, Macarratane, Chigubu/Funhalouro, and Temane to facilitate domestic distribution and consumption. In South Africa the pipeline extends from Komatipoort and traverses 340 kilometres through Kaapmuiden, Badplaas, and Bethal to Secunda where Sasol's synthetic fuel and chemical manufacturing plant is located.

On arrival at the South Africa Secunda plant the natural gas is integrated into Sasol's feed network. A portion of this gas is utilised as supplementary feedstock to coal. Technical and engineering conversions were effected on the Secunda plant to enable the utilisation of gas. Gas deliveries were

planned to begin at 80 million Giga Joules (GJ) per annum, rising to 120 million GJ and be applied to the production of downstream chemicals including waxes, ammonia and solvents. Surplus gas is then fed into Sasol's 500 strong industrial customer base and 13 000 domestic users fed via Egoli Gas.

4.7.2 Financial Structure

4.7.2.1 Ownership structure

The consortium members and shareholders in the SNGP are illustrated in Figure 4-4 and are described below. Sasol Holdings is listed on the Johannesburg and New York Stock Exchanges. The company is a global petrochemicals and liquid fuels organisation with leading proprietary intellectual capital in related commercial processes. Sasol Petroleum International (SPI) is the vehicle company for the upstream gas and petroleum exploration and development activities of Sasol. Sasol Petroleum Limitada (SPT) is a Mozambican 100% owned subsidiary of SPI. It houses the 70% equity stake in the Temane/Pande gas fields and related gas central processing facility. Sasol Gas Holding (SGH) is a South African subsidiary of Sasol Holdings. It houses the equity stake in the pipeline portion of the project known as Republic of Mozambique Pipeline Investments Company (ROMPCO). ROMPCO is a company registered to house the physical infrastructure, liabilities, and general operating activities of the pipeline constructed between Mozambique and South Africa. It is a joint venture made up of three shareholders namely, the South African Gas and Development Company (25%), Companhia Mocambicana de Gasoduto (25%), and Sasol Gas Holdings (50%). The South African Gas Development Company (i Gas) is a wholly owned subsidiary of the Central Energy Fund, the latter being a 100% government owned entity. It invests in gas related infrastructure and commercial assets. The Government of Mozambique (GOM) represents the executive branch of the Republic of Mozambique. Empresa Nacional de Hidrocarbonetos de Mocambique (ENH) is an entity set up by the Mozambican government to house the equity stakes in which it mandatorily takes up upstream oil and gas related ventures in Mozambique. Companhia Mocambicana de Hidrocarbonetos (CMH) is a company specifically created to house the assets, liabilities and operating activities of the Temane and Pande gas field developments together with the central processing facility constructed to purify the gas prior to transmission. Companhia Mozambican a De Gasoduto (CMG) is a 100% subsidiary of ENH and invests in gas pipeline and related infrastructure assets in Mozambique's gas sector.

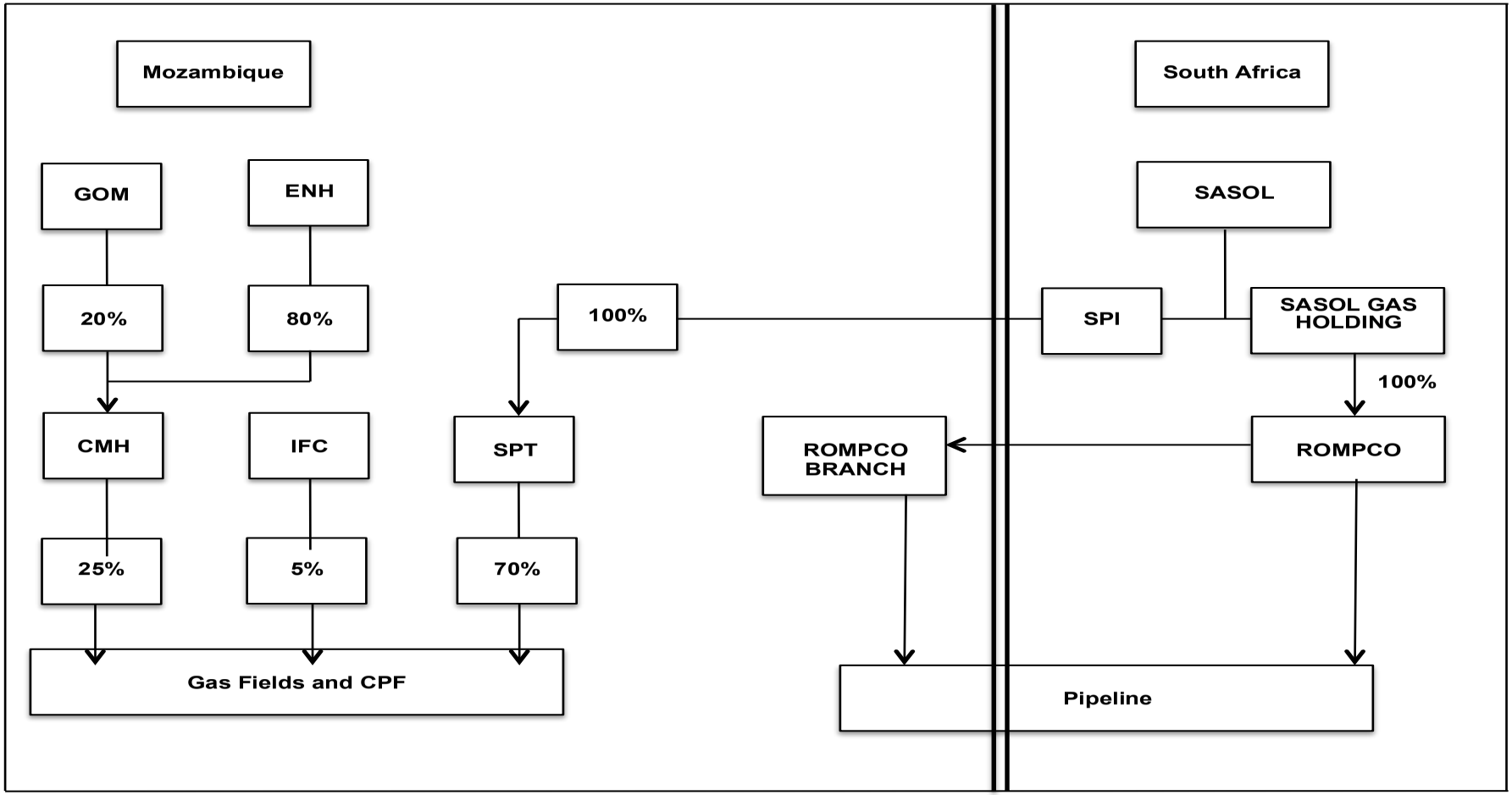


Figure 4-4: Sasol Natural Gas Project Participants (Sasol Holdings, 2014)

Figure 4-4 illustrates Sasol has an effective 70% stake in the Temane and Pande gas fields, together with the central processing plant through SPT and SPI. The IFC has a direct 5% equity stake in the gas fields and central processing plant. CMH houses the interests of the Mozambican governments and has a 25% equity stake in the gas fields and the processing plant. The Mozambican government also has a direct stake in CMH amounting to 20% of its equity. In the South Africa quadrant SGH is the 100% owner of South African registered ROMPCO. Sasol effectively owned 100% of the equity in the pipeline at the projects inception.

How the financing was arranged

In arriving at the financing arrangements a number of factors had to be taken into consideration including what each equity investor was contributing to the project besides capital, the limited appetite and capacity to commit capital to a potentially high risk project by state companies in both Mozambique and South Africa, and the fact that over 60% of the capital was to be applied to the pipeline construction and this was where the bulk of project risks resided. Mozambican legislation also prescribed that state equity participation to be mandatory in all hydrocarbon projects. The decision making process in both governments was extended whilst Sasol wanted to move rapidly ahead on the project. Mitigating these concerns were Sasol's technical expertise and proven capability in the sector, and its willingness to use its own balance sheet as primary sponsor. The anticipated costs and respective capital contributions of the project in 2003 are expressed in Table 4.6.

Table 4.6: Total Project Costs – Upstream Development – (Sasol Holdings, 2014)

Source of Funds and Application	Amount "million" US$
CMH – Gas Fields and CPF	
Equity	18
Debt	38
Total	**56**
IFC Total	**R10**
SPT – Gas Fields and CPF	
Equity	148
Debt	182
Total	**R330**
SGH – Pipeline, Gas Fields and CPF	
Equity	285
Debt	320
Total	**605**
Gross Project Cost	**1 001**

Debt funding for the project was raised in a competitive bidding process with debt providers bidding for various debt tranches. It is instructive that Standard Bank extended an R 1.05 billion secured long-term debt facility in 2005, had the option to syndicate this amount, yet decided not. Due to Mozambique's frontier market status all facilities were covered by political risk insurance.

4.7.2.2 Capital Structure

Table 4.6 above reflects a debt to equity ratio of 53.9%: 46.1% based on anticipated project costs alone. Further insight on how the capital structure evolved can be deduced by analysing key financial metrics from the annual financial statements of ROMPCO. Table 4.7 below details key financial ratios in ROMPCO from 2005 to 2012. The years 2004/5 are distorted and do not reflect stable state operations. The marked improvement in the current ratio from 2004 and 2005 is primarily driven by an increase in cash from R 31 million to R 180 million. During the same period creditors declined R 281 million but was offset by an increase in the current portion payable of the long-term loan of R 236 million. Cash equivalents increased markedly to R 480 million by the end of 2007 reflecting the highly cash generative nature of the pipeline. 2007 also marked a maiden dividend pay-out of R 118 million, increasing to R 260 million and R 300 million in 2008 and 2009. These dividend declarations, the extinguishing of debt facilities of R 122 million and concomitant cash reduction, account for the deterioration in the current ratio to 0.52:1 by the end of 2009. Despite a R 360 million dividend pay-out in 2010, the cash situation stabilised resulting in a current ratio settling at above 0.84:1 in subsequent years.

The DSCR from 2006 to 2009 reflects an improving trend as operating cash flows increased. The deterioration in 2010 is caused by the decline in cash generated from operating activities and the DSCR stabilises above 2.23:1 in subsequent years. The debt to equity ratio begins at 99%: 1% reducing to 66%: 34% showing a clear preference for debt funding in the initial years of the project. The shareholder loans are settled in full during the course of 2012 in largely from record operating cash flows in excess of R 1.3 billion, resulting in a decline in the debt to equity ratio to 66%: 34%. Gross and operating margins from 2006 to 2012 are in a consistent range of 73% - 82%. The non-current liabilities constitute long-term debt obligations of approximately R3.2 billion from 2004 to 2007. The relative stability of this figure indicates that ROMPCO was servicing the interest accruing on these loans but making little contribution towards the repayment of the principal amounts until 2008.

Table 4.7: Key Financial Features ROMPCO: 2004 – 2012 (ROMPCO Annual Reports, 2004 - 2012)

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Current Ratio	0,39:1	1,11:1	1,93:1	3,26:1	1,61:1	0,52:1	0,94:1	0,98:1	0,84:1
Debt Service Coverage Ratio	3,10: 1[4]	0,27:1	1,51:1	1,72:1	1,74:1	2,30:1	1,90:1	2,23:1	2,29:1
Debt to Equity Ratio %	- % [5]	99%: 1%	96%: 4%	94%: 6%	90%: 10%	90%: 10%	89%: 11%	82%: 18%	66%: 34%
Gross Margin	10,50%	67,67%	74,42%	75,33%	78,70%	81,57%	81,40%	78,57%	79,12%
Operating Margin	639%	-1%	73%	71%	83%	77%	78%	80%	81%
Dividend Paid Out (R "000")	-	-	-	118 000	260 000	300 000	360 000	330 000	390 000
Non Current Liabilities (R "000")	3 287 344	3 340 235	3 271 370	3 149 187	3 051 586	3 128 431	3 334 981	3 094 715	2 577 009
Cash Flow Generated from Operating Activities (R "000")	203 804	126 666	535 304	671 555	764 406	989 675	782 186	1 130 306	1 315 346

[4] This has been calculated as cash generated from operating activities divided by the borrowing costs plus the short-term portion of the long-term debt.

[5] Negative equity due to accrued losses at the beginning of the project render this figure of limited utility.

4.7.3 Key risks

For the SNGP to be successful the governments of South Africa and Mozambique, and Sasol itself had to be actively involved. From the Mozambican authorities the project was reliant on the gas concession, registering land and servitudes, and the route the pipeline would traverse. From the South African authorities, the project was reliant on the legislation and regulations that would enable the importation of gas from Mozambique, the pricing methodology, the pipeline route, and the development of the South African residential and industrial market including gas distribution infrastructure. Significant portions of the risks in the SNGP were retained by Sasol. The funding for the SNGP is therefore not a pure project finance model, but a hybrid model of project finance and traditional corporate finance. The key risks retained by Sasol included development risks on the gas fields, construction and initial operational risk on the ROMPCO pipeline, and explicit and perceived guarantees on portions of the debt arrangements.

Regulatory and environmental

At the time the SNGP was conceptualised he Gas Bill and related regulations governing Sasol's importation of gas from Mozambique to South Africa had not been passed. Certainty for Sasol and other stakeholders was obtained by way of a special regulatory dispensation between the Minister of Minerals and Energy and the Minister of Trade and Industry. This agreement in effect put in place a series of protocols governing licensing and the regulations that would be applicable to Sasol in terms of the Gas Bill once it had been finalised into a legislative Act, and the relevant regulations had been effected. This regulatory agreement was novel in facilitating the transaction, and ensuring it was not held up by the legislative and regulatory process. The Pipeline Agreement is for a 30-year duration whereas the Gas Transportation Agreement is for a 25-year period. Project developers included a 5-year buffer period regarding when the contract with downstream customers expires to the time their license arrangements on the pipeline with the Mozambican's terminates. The funding arrangements were also structured so that outstanding debts are settled before the end of these regulatory concessions.

A series of legislative and regulatory prescriptions governed the SNGP. The most significant regulatory instruments impaction on the EIA in Mozambique included the National Environment Management Programme (NEMP), the Environmental Law (EL), and the Regulations for the

Environmental Impact Assessment Process (REIAP) that cumulatively required a license prior to commencement. In Mozambique the environmental compliance process was administered and reviewed by the Department of Environmental Impact Assessment in the Ministry for Co-ordination of Environmental Affairs (MICOA). In South Africa the most significant regulatory instruments impacting on the EIA were the Environment Management Act (EMA) and the Environment Conservation Act (ECA). Legal authorisation is required prior to the commencement of such for transportation structures or the handling of hazardous or dangerous substances and ROMPCO fell within this ambit.

The SNGP EIA and resultant Environment Management Plan (EMP) were drafted in 13 sequential and clearly stratified parts. Each impact was mitigated by a comprehensive set of measures in an EMP that was administered, monitored and managed by a dedicated team. The EIA evaluated the project per each phase. This allowed for a focused evaluation of the environmental footprint and targeted interventions to mitigate adverse impacts. Environmental risk management was also allocated to project managers. The mitigating measures in the EMP were complemented by a series of qualitative interventions that addressed broader communal and societal factors. A wide-ranging public consultation process was also followed that culminated in the disclosure of the SNGP details to a range of stakeholders. The communication structures included the Mozambican Ministerial Task Group, Sasol Executive Management, a Project Liaison Committee of 26 members from Sasol's operational management levels, public liaison and education, complaints management, and social development activities. The SNGP required a number of people to be relocated, and a Resettlement Planning and Implementation Programme was executed. In this respect the host governments were essential in obtaining servitudes and concessions on the pipeline route, and disruption of local communities was limited by laying the pipeline underground, which also had the benefit of making it less vulnerable to sabotage.

Construction and technology

Despite commissioning reputable EPC contractors in a competitive bidding process, Sasol retained and bore a significant proportion of the construction risk. This was on account of the fact that issues relating to servitudes, the route the pipeline would take, geological considerations etc. were beyond the control of the EPC contractors. A turnkey arrangement including these aspects was therefore unviable. EPC contractors were therefore engaged on a turnkey basis only on those

aspects over which they had direct control including pipeline manufacture and construction. The technology deployed was tried and tested with a low probability for malperformance.

Market

To mitigate against market risk, Sasol was the largest offtaker to ROMPCO and this was captured in the Gas Sales Agreement detailed in the institutional and legal arrangements below. In addition the 50% shareholding by iGas and CMG in ROMPCO post construction allowed access to retail and industrial customers in both countries.

Credit and equity

Standard Bank was lead arranger on the loan facilities to ROMPCO, and SPT. To mitigate against credit risk Standard Bank received loan guarantees from the World Bank/IFC and related insurance institutions. Project lenders were exposed to take the first loss in amount equivalent to 5% of the principal amount of the guaranteed loan plus 6 months interest payments for the applicable interest payment period. For equity risk the guarantee arrangements took place in two phases. In the first phase effected in 2003 MIGA issued equity guarantees to Sasol amounting to US$ 72 million. This consisted of a ROMPCO equity guarantee of US$ 45 million and an SPT guarantee of US$ 27 million for Sasol's catalysing equity injection in the pipeline construction and the gas field and processing facility**,** respectively. The second iteration of the guarantee arrangements in 2004 replaced the equity guarantees issued in 2003, and in addition covered loans taken by SPT and ROMPCO. As with the earlier version the guarantee covered risks of transfer restriction, expropriation, war and civil disturbance and breach of contract.

Foreign exchange and interest rate

On account of the limited convertibility and volatility of the Mozambican Metical, the domestic currency was unable to perform the role of legal tender in transactions relating to the SNGP. The upstream activities including the gas extraction and central processing facility incorporated a natural hedge as the gas proceeds were denominated in United States dollars and matched by costs predominantly in the same currency. The ROMPCO pipeline had considerable foreign exchange exposure as a rand based entity with dollar costs and with final consumers in South Africa would settle their consumption in rands. This foreign exchange exposure in ROMPCO was addressed in the tariff structure by incorporating a dollar-

based element in the formula effectively dollar referencing a proportion of the income and expense structure. This mechanism was essential as customers and sovereigns in both South Africa and Mozambique would have refused signing dollar based off-take agreements with 25 years of exposure. The financial statements of ROMPCO reveal the purchase of financial instruments to hedge the foreign exchange risks on account of the multiple currencies and national jurisdictions of parties to the project, together with the fact that natural gas is a dollar denominated commodity in international markets. ROMPCO also fixed its interest rate by utilising interest rate swaps to exchange its floating interest exposure to a fixed interest rate exposure of 7.55% on designated liabilities.

Political

As highlighted earlier, political risk insurance including transfer restriction, expropriation, war and civil disturbance and breach of contract was a mandatory condition of the lenders participation in the project. This significantly increased transaction costs. Respondents expressed willingness to not taking political risk insurance in contemporary Mozambique. This infers that transactors should incorporate flexible insurance clauses that allow for periodic re-pricing, that may allow for a reduction in transaction costs if the political environment improves. The IPA signed between South Africa and Mozambique presaging the SNGP added to the armoury of political risk mitigants by committing sovereigns and their underlying institutions to support cross border investments. The importance of interactions especially with host governments and communities was an essential element in mitigating against political risk. In Mozambique particularly, the relationship development was intentional, structured, because the country had limited expertise in dealing with international banks and complex funding structures. The key goal was “making sure everybody is comfortable with the process and that they do not feel that something is being forced upon them…[and] as long as the transaction is fair and everybody understands how each party will benefit then the relationship can only grow…”.

4.7.4 Institutional and legal arrangements

There were a series of legal agreements and contracts in the execution of the SNGP. These are summarised below in Table 4.8, with elaborations on the key contracts following thereafter.

Table 4.8: Project Agreements (Sasol Holdings, 2014)

Rights and Obligations		Commercial	Operations and Participation
South Africa	**Mozambique**		
Cross Border Agreement	Cross Border Agreement	Gas Transportation Agreement	Upstream Operation and Maintenance Agreement
Mozambique Pipeline Agreement	Pipeline Agreement	Gas Sales Agreement	Pipeline Shareholder's Agreement
Gas Act	Petroleum Production Agreement		Joint Operating Agreement
Regulatory Agreement	Production Sharing Agreement		Pipeline Operation and Maintenance Agreement

The Petroleum Production Agreement (PPA) articulated the Mozambican government granting SPT and CMH exclusive rights for the development, production and disposal of reserves located in the Temane and Pande gas fields. This was the basis upon which all the upstream activities were predicated. SPT and CMH subsequently signed a Joint Operation Agreement (JOA) for the development of the gas fields with SPT being designated as the operator in terms of this agreement. The PPA was also followed by a Gas Sales Agreement (GSA) that regulated the commercial agreement and terms between the gas sellers (SPT, CMH, and the IFC), and the buyer of the gas SGH.

The pipeline agreement (PA) granted authorisation to ROMPCO to construct, own and operate the gas pipeline and related infrastructure for a period of 30 years, and was issued by the Mozambican government. The PA was supported by a Gas Transportation Agreement between ROMPCO and the upstream project participants. The Gas Transportation Agreement secured a revenue stream for ROMPCO by way of a ship or pay obligation in favour of ROMPCO for a period of 25 years.

The contractual agreements are structured around the different phases of the contract. The first set of contracts prescribe the terms of engagement for the organisations that are party to the upstream activities, namely SPT, CMH and the IFC. These arrangements are then followed by contracts setting out the terms by which the extracted and processed gas will be sold to SGH, which owned 100% of ROMPCO at the project's commencement. In addition, the transportation arrangements of the gas to Secunda are set out with ROMPCO. The final tranche of contracts deals with the downstream regulatory aspects and distribution terms with end users.

4.7.5 Lessons learned

The SNGP offers two broad categories of lessons. The first category is a broad range of interventions including regulatory and financial measures without which the project would not have been possible. The second category of lessons identifies weaknesses in the institutional arrangements that underpin many infrastructure projects in Africa, and proposals as to how to address these.

The ability for private sector players to constructively engage and work jointly with sovereigns is an essential capability. This is accentuated where countries must collaborate with each other to facilitate a cross border project. The emphasis by Sasol on developing a mutually beneficial, long term, and transparent relationship particularly with the Mozambican government is instructive. Sasol deviated significantly from conventional commercial arrangements to enable the SNGP. This included deferring the capital contribution of other sponsors, and facilitating their deferred participation by way of the call option agreement. The construction of the pipeline in a manner that offshoot stations could be built in at a later date to supply the domestic Mozambican market gave the Mozambican authorities confidence that the gas extracted would at some point be applied to the local economy. This goal has come to fruition with buses in Maputo and the Mozal Aluminium Smelter using gas derived from the SNGP as sources of fuel.

Companies executing projects impacting on rural communities need to take even greater measures to ensure these communities are consulted and that there is buy-in to the project. Obtaining approval from national authorities only is insufficient and can undermine the legitimacy of a project. The use of normative tools and legislation alone is insufficient to ensure companies act responsibly regarding human rights, the environment and social justice. Consequently, companies should seek to embed within their fabric strong human rights and social responsibility mechanisms. The latter need to be universally applied across divergent countries to avoid employees seeking to fulfil the bare minimum standards required. In this respect normative rules should be mandatory in developing countries with an independent and fully resourced institution established to audit and verify compliance. NGO's creating "demand" for social justice should also create "supply" by way of training and engaging with legislators and other stakeholders to capacitate them to ensure legislation and regulatory measures support the attainment of social and environmental justice.

4.8 Mozambique Country Cluster Comparison

A comparison of the two case studies investigated in the Mozambican cluster makes a number of pointed revelations. Most apparent is the essential role played by South African capital markets with 71% and 100% of equity capital for Mozal and the SNGP being sourced from SA. While both projects made extensive use of international debt funding from four continents, the Mozal project was the most prodigious. This occurrence is explained by the fact that the project was pioneering in nature and the participation of multiple funders was a purposeful risk management strategy. The improving investment climate in Mozambique more than 20 years after the conceptualisation of Mozal has diminished the need of such large funding consortiums as evident in the SNGP.

The sponsor arrangements in the projects are revealing. In Mozal, BHP and Mitsubishi were sponsors who benefited from the project at other stages of the value chain including supply of bauxite (BHP) and provision of alumina (Mitsubishi). Each individual sponsor as a result was not fully exposed to the entire value chain, which served as a risk mitigating exercise and beyond Mozal, focused Mitsubishi and BHP on the part of the value chain that they were directly able to control. The small stake owned by the Mozambican government gave the project political legitimacy and the participation of the IFC provided a political umbrella. In contrast beyond the limited equity participation of the Mozambican government in the Temane Gas Field and CPF, Sasol alone sponsored ROMPCO. It controlled the entire value chain on the SNGP from gas extraction, purification, transportation, and final consumption. The sponsorship arrangement was informed by Sasol's technical capacity to execute the project, but also on the reluctance of the participating sovereigns to bear construction risk. Without this high degree of commitment on the part of Sasol, the project may not have been commissioned.

On Mozal the participation of the Mozambican and South African governments was largely confined to regulatory and facilitating initiatives for the entire project life. In contrast the SNGP commences with government participation limited to the above, but post construction the equity participation of both governments amounts to 50% in ROMPCO. The arrangement allowed Sasol to take the full construction risk, but limit its capital exposure together with other political risk exposures by, reducing its stake in ROMPCO after operational steady state was achieved.

Both projects made extensive use of international professional advisers due to the geographically diverse funding consortium and service providers

commissioned. This contributed to both projects integrating international best practice across engineering, financial and legal processes enhancing the robustness of the projects. Project sponsors on both contracts were committed to the venture for its full life with no equity exits recorded to date. As of June 2015 both projects were mature and stable in their operations and the capital structure was evolving as forecast. The business landscape differs markedly for each venture. Mozal is subject to the dynamics of a highly integrated international aluminium industry. The tax incentives granted by the Mozambican government appear unlikely to be renewed when the project life concludes, and the generous electricity tariff will be renegotiated with power shortages bedevilling Southern Africa. Conversely the SNGP is exposed to generic international energy dynamics. The logistical and technical complexity of transporting gas however makes this sector more localised and less vulnerable to global shocks. With dedicated long-term customers in the form of Sasol, iGas, and CMH, the project is stable and firmly positioned. Whilst the diversity of the international funding consortium reduces the prospect of refinancing the Mozal debt facilities, the SNGP sponsors are receptive to potential refinancing on agreeable terms. The non-refinancing of Mozal is informed also by potentially large breakage fees on the part of the sponsors, and that debt providers may be reluctant to sacrifice pricing and yield that would be difficult to obtain on greenfield projects at present. Table 4.9 distils some of the key comparative attributes between Mozal and the SNGP and the key contributors to success.

Table 4.9: Mozambique Case Comparison

Attribute	Mozal	Sasol Natural Gas Project
Geographic Source of Funding	• Debt funding from South Africa, Asia, Europe and North America • Equity funding from 71% -South Africa, 25% - Japan	• Debt funding from South Africa, Asia, Europe and North America • 100% equity funding from South Africa
Nature of Equity Participants	• Multi-national in commodities mining and processing • Multi-national in manufacturing with significant aluminium input requirements • Symbolic stake by Government of Mozambique • DFI	• Private sector petrochemicals corporation
Government Participation	• Participation by Mozambican and South African governments limited to regulatory matters and project facilitation	• Participation by Mozambican and South African governments limited to regulatory matters and project facilitation in pre-construction phase • Post construction, both sovereigns exercised options and took indirect 25% stake in ROMPCO each
Debt Funding Institutions	• International consortium of banks • DFIs	• Commercial Banks • DFIs
Use of International Service Providers	• Extensive use of technical, legal, and financial advisers in finalisation of funding package • Smelter equipment sourced from France	• Extensive use of technical, legal, and financial advisers • Multiple international operators in EPC of pipeline
Time Commitment of Sponsors	• Full duration of project	• Full duration of project

Attribute	Mozal	Sasol Natural Gas Project
Project Stage	• Initial project concept mature and stable	• Initial project concept mature and stable
Business Landscape	• Project subject to international aluminium industry dynamics • Generous tax incentives unlikely to be extended • Similarly power purchase agreement will be renegotiated • Commercial merits of project continuance from 2020 unclear	• Generic challenges of international energy markets and natural gas sector • Project robust with committed long term customers
Capital Structure Post Completion	• Capital structure stable and evolving as forecast	• Capital structure stable and evolving as forecast
Governance Structure Post Completion	• No significant changes	• No significant changes
Significant Environmental/Sustainability Incidents	• Non reported	• Non reported
Risk Universe Dynamics	• Stable and well managed	• Stable and well managed
Refinancing Initiatives	• Non reported	• Refinancing being considered but not yet effected • Prospect of using infrastructure bonds on future projects of this nature

Zimbabwe Case

4.9 Chisumbanje Ethanol Plant

FACT SHEET	
Project Description	▪ Anhydrous ethanol production plant (ethanol milling, fermentation, and distillation) ▪ Development of designated agricultural land to provide sugarcane feedstock ▪ Co-generation electricity plant (by product) ▪ Downstream biomass manufacturing
Key Personnel	▪ Billy Rautenbach – Project principal, owner, and sponsor ▪ Paul Smith – Operations Director – Green Fuel (Pty) Ltd ▪ Graeme Smith – Operations Manager – Green Fuel (Pty) Ltd ▪ Derek Elliot – Legal Counsel – Green Fuel (Pty) Ltd ▪ Lilian Muungani – Public Relations Officer – Green Fuel (Pty) Ltd ▪ Basil Nyabadza – Chairman – Agricultural and Rural Development Authority
Plant	▪ First Knives Turbine and Drive – Refurbishment in Brazil ▪ Defibrator and Drive Motor – Supplied by Bononi (Brazil) ▪ Mills – Refurbishment in Brazil ▪ Turbines and Primary Boxes – Refurbishment in Brazil ▪ Boiler – Supplied by Caldema (Brazil) ▪ Turbo Alternator Complete – Purchased in Brazil ▪ Distillery - Refurbished ▪ Storage Tanks – Fabricated on site
Objectives	▪ Production of 100 million litres of ethanol per annum ▪ Blending of ethanol into domestic petrol ▪ Development of regional agricultural sector ▪ Employment creation and poverty alleviation ▪ Energy security and independence ▪ Reduce foreign exchange outflows for energy imports ▪ Generate electricity by product of up to 36MW
Funding and Shareholders	▪ Investment range to date: December 2013– US$ 130 million - US$ 330 million ▪ Full funding requirement – Circa US$ 2.3billion (Phase I – US$ 1.34 billion; Phase II – US$ 260 million; Phase III – US$ 450 million; Phase IV – US$ 1 billion) ▪ Green Fuel (Private) Limited– SPV housing assets and operations of Chisumbanje Ethanol Plant ▪ Shareholding of Green Fuel made up as follows: ▪ Government of Zimbabwe (10%) o Agricultural and Rural Development Authority of Zimbabwe ▪ Macdom Investments and Rating Investments (90%)
Products and Services	▪ Anhydrous ethanol and refined sugar ▪ Electricity ▪ Fusel oil and high protein stock feed ▪ Energy briquettes and chip board manufacturing

4.9.1 Background

The Chisumbanje Ethanol Project (Chisumbanje) cannot be fully understood without a historic contextualisation of social, economic and political developments in Zimbabwe spanning the past 130 years. These events have had an indelible impact on the capital structure, governance arrangements, risk management, and environmental and sustainability challenges encountered. The first historical consideration relates to the disenfranchisement of land from indigenous populations from by colonial forces beginning in 1890. This was followed by a series of uprisings or "Chimurenga" culminating in the Lancaster House Agreement in 1979, and national independence in 1980. To conclude the Lancaster House Agreement, sections retaining existing land ownership patterns, and prohibiting expropriation were prescribed for a period of 10 years (Martin et al. 1981). As the political fortunes of the governing party Zanu (PF) deteriorated on account of an economic meltdown, a fast track land reform programme was instituted in 2000. This forcefully expropriated land from the descendants of colonial settlers who were commercial farmers, and distributed significant tracts to indigenous population. This has resulted in a situation where the relationship between the possession of title deeds and ownership of land is tenuous. In addition, significant portions of land are under government ownership, or are held in communal ownership under the custodianship of traditional leaders. Land continues to be a highly contested resource.

The first ethanol blending plant on the African continent was the Triangle Ethanol Plant in Zimbabwe that began production in 1980. Its activities included the blending of ethanol into petrol at levels of 12% to 15%. The plant's had a capacity of 120 000 litres per day, using multiple feedstocks including molasses, cane juice, and raw sugar. To support import substitution and domestic industrialisation 60% of the plant components were produced locally. This plant stopped producing ethanol and instead began to produce industrial alcohol for export to Europe after losing government support in 1995. This marked the end of ethanol blending in Zimbabwe until the commissioning of the Chisumbanje Ethanol Plant. In 2008 the Zimbabwean government requested investors to invest in a new ethanol plant in the country. The Chisumbanje Ethanol Plant was subsequently commissioned by a firm called Green Fuel with construction of the first phase completed in September 2011, and with an annual output of 100 million litres of ethanol. It was envisaged that the plant would also commission an electricity-generating unit of 18.5 MW that could be expanded to 36 MW by 2012. The scope of activities incorporated in the

plant includes milling, fermentation, distillation, and dehydration of ethanol. Further downstream activities include the generation of electricity via methane gas derived from anaerobic digestion of waste products from the plant. The manufacture of energy briquettes and chipboard products are also envisaged. This case study is characterised by a high level of obscurity with key institutions, including the Zimbabwe Energy Regulatory Authority complaining about access to information.

4.9.2 Financial structure

Ownership structure

The shareholders of Chisumbanje are the Government of Zimbabwe (GOZ) with a 10% via the Agricultural Rural Development Authority (ARDA). State participation is critical to the project as the GOZ passed legislation and regulations prescribing mandatory blending. ARDA is also essential to the project due to large land tracts under its custodianship including 22 estates with 98 000 hectares of arable land, and irrigable capacity of 19 000 hectares. Most of the land for Chisumbanje has been sourced from ARDA. Green Fuel (Private Limited) is the special purpose vehicle housing the operations of the Chisumbanje Ethanol plant and the related assets. It describes itself as a company specialising in renewable ethanol production and related activities. Macdom Investments (Macdom) and Rating Investments (Rating) are the largest investors in Green Fuel with a combined 90% shareholding. These companies are vehicles for the investment activities of one of the key developers of the Chisumbanje, namely, Billy Rautenbach.

How the financing was arranged

Zimbabwe has suffered severe bank and capital market disruptions particularly post 2000. International development finance institutions including the World Bank, IFC, and IMF suspended financial support when the country fell into arrears on existing facilities. With the liquidity constraints in Zimbabwe's domestic banking sector and mandatory reporting requirements for banks on significant credit exposures, it is improbable that the capital was sourced domestically. The principal sponsor Billy Rautenbach is has claimed an investment of US$ 330 million in the plant as of December 2013, whilst the Chairman of ARDA has committed US$ 260 million for the construction of a dam to augment supplies. These claims are and the nature of the injections in the form of debt and equity, and the proportions thereof also remain undisclosed. References to interest service charges by sponsors may indicate an

element of debt funding. The proportion of debt funding and the resultant debt to equity ratio cannot be established. The parties extending the credit facilities are also not generally known. What is evident is that the assets are made up of two main parts. The first is the plant and related equipment. And the second is the land used to grow the sugar cane and related infrastructure including dams, irrigation facilities etc.

Operational arrangements

The operational arrangements pertinent to the Chisumbanje Ethanol plant are captured in Figure 4-5 below. The foundation of the project is a 20-year Build Operate and Transfer (BOT) concession to produce ethanol in the designated area issued by the government of Zimbabwe to the operator Green Fuel. The government of Zimbabwe awarded 'National Project Status' to Green Fuel according this venture priority status and treatment. The Environmental Management Agency (EMA) is responsible for evaluating the EIA submitted by Green Fuel prior to commencing the project. The EMA failed to issue a response to the submission after 60 months resulting in Green Fuel proceeding by default. ARDA's participation enabled Green Fuel access to state owned arable land that was operating below capacity. This was the basis upon which sugar can feedstock was to be cultivated for the ethanol plant. As a state entity ARDA provided political cover for contentious land issues with local communities as detailed in the risk management section. The final player in the operational arrangements was the Zimbabwe Energy and Regulatory Authority (ZERA). ZERA controversially issued a license to Green Fuel. This license enabled Green Fuel to be a registered supplier for the mandatory blending of anhydrous ethanol with unleaded petrol.

4.9.3 Key risks

Regulatory and environmental

The Zimbabwe Energy Regulator (ZERA) was established in 2011, which coincided with the year in which the first phase of the Chisumbanje Ethanol Plant became operational. As a result, ZERA was not involved in the regulatory oversight on the conceptualisation or commissioning of the plant in 2008, and has sought to apply its regulatory prerogative retrospectively on an existing plant. The Chisumbanje Ethanol Plant is an anomaly from a regulatory perspective in a number of respects. The developers obtained a 20-year concession to Build Operate and Transfer (BOT) the plant allowing them to recoup their capital investment and

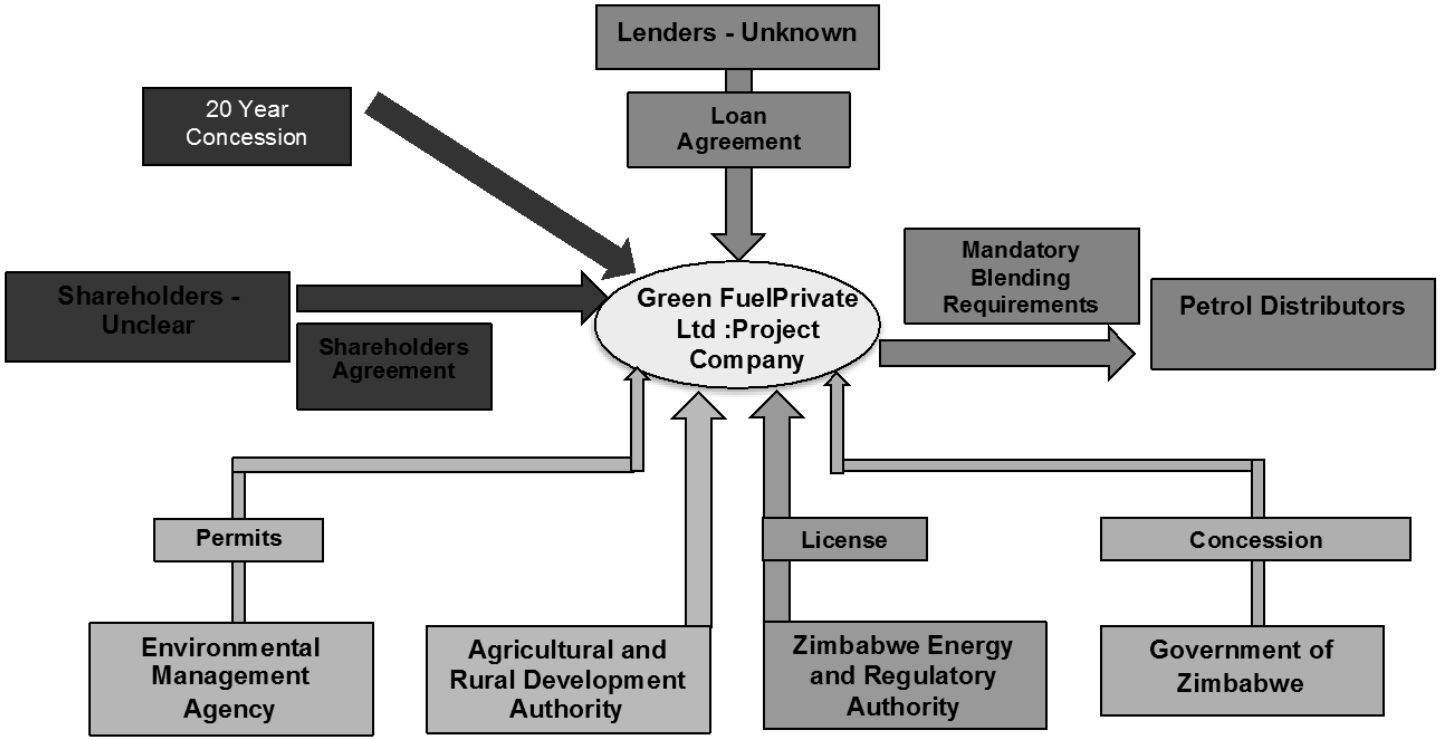


Figure 4-5: Chisumbanje Ethanol Plant Operational Arrangements

generate profits. The BOT provisions effectively gave the operator independence in the management of operations, limiting the potential for external political interference. This arrangement is important, as there were a number of critics of the project who argued that it should have been structured as a joint venture with the state.

Firstly, the Zimbabwean regulatory requirements on ethanol production prescribed a partnership or joint venture with government across three spheres namely, agricultural, transportation and plant operations. These regulations were not fully applied in the case of Chisumbanje, which is largely premised on a BOT arrangement with no government participation in the plant operations and transportation spheres. ZERA was in the difficult position of having to determine the price to be paid for ethanol based on a formula that included the capital replacement cost, heat content of the ethanol and other technical aspects. This responsibility was complicated by the fact that the plant has multiple processes with different cost structures. In addition the ability of the regulator to independently verify cost submissions on the plant was compromised by the fact that the project was first built and only regularised thereafter. While ZERA was able to subsequently obtain certain disclosures from Green Fuel including on the financial, technical, operational, legal and related documentation, the Green Fuel principals have not been "as forthcoming" as would be expected. IPPs submit the set documentation to ZERA under a non-disclosure agreement with the understanding that the "regulator is primarily interested in the cost structure of plant as this is essential in determining the tariff". In the Chisumbanje case, even the regulator is dissatisfied would the disclosure process and details.

Key to the Chisumbanje project was the introduction of regulations prescribing the mandatory blending of ethanol with petrol. It is noteworthy that these regulations were not in place in 2009 when the construction of the plant commenced. These regulations only came to pass in August 2013 resulting in a temporary mothballing of the plant for two years. During this period Green Fuel lost significant amounts as it continued to pay salaries and service debt interest. The pricing of the ethanol has been a key issue of contention. ZERA has set a floor price of US$ 0.75 per litre to ensure certainty for producers. This price is significantly higher than almost all international equivalents. In January 2015 the ethanol price of US$ 0.95 was the highest in the world. According to the regulator this price has been established to enable the project to cover its cost and recoup its capital investment. The US$ 0.95 tariff is below the Green Fuel tariff proposal based on a cost plus model of US$ 1.05 per litre. These

elevated prices have proven to be contentious amongst the Zimbabwean public. The broad public resistance to using blended fuel in part stems from the fact that the mandatory nature of the regulations does not give end users an option. Fleet managers have also expressed reservations on the effect the blended product has on the mechanical integrity of the engines in their vehicles, possibly rendering original equipment manufacturer warranties invalid. The steep drop in the price of crude oil has also compromised the economic viability of ethanol blending since July 2014. In January 2015 imported petrol in Zimbabwe cost US$ 0.50 per litre. Ethanol was being blended into this at US$ 0.95 per litre rendering the economics of the blended product highly questionable.

Green Fuel has sought to integrate sustainable and environmentally friendly agricultural practices by ensuring no land clearing and minimum tillage in the cultivation of sugar cane. In addition, the plant includes comprehensive downstream activities that utilise waste products from the ethanol plant for other economically beneficial activities. Three key pieces of legislation govern the Chisumbanje Ethanol Plant in Zimbabwe. The first of these is the Environmental Management Act (EMA). The EMA prescribes that an Environmental Impact Assessment be performed and authorisation received prior to commencement. EMA's failure to adjudicate Green Fuel's EIA within 60 months meant authorisation for the project was granted by default. The second piece of legislation is the Energy Regulatory Authority Act administered by ZERA as described above. The final piece of legislation is the Agricultural Land Resettlement Act that sets out the requirements and procedures for the legal and equitable resettlement of rural communities in the conduct of agricultural activities. The displacement and relocation of people has damaged the community fabric and resulted in the destabilization of households and the loss of social ties as families move further away from each other. Food security for many families who practised subsistence farming and hunting livelihoods has also suffered. Relocations have resulted in a degree of loss of access to social services such as schools, clinics and hospitals that have compromised the health and education opportunities of learners. Many residents have complained of not having received compensation for this relocation and displacement. There have been sporadic community protests regarding the project. The resettlement of families has resulted in disputes regarding compensation after being forcibly removed from their ancestral homes. The locality has also witnessed a militarisation and heightened police presence. Benefits that have accrued as a result of the project have included employment opportunities for locals and increased commercial activity in the adjacent town and urban areas. The

construction of dams, irrigation and related facilities has increased the infrastructure stock and the more intense utilisation of land resources has elevated economic output.

Finally, the project appears to have been exempted from Zimbabwean indigenisation laws that require a majority percentage to be owned by locals. In addition, that capital equipment imported to execute on the project was not levied the statutory import duty.

Construction and technology

The project developer's made significant use of Brazilian technical advisers and expertise in the plant design, procurement, and construction phases. However, these external skills were transferred to the local management team in terms of the day to day running of the plant making it largely skills self-sufficient. This was an achievable goal as expertise on the management and operations of ethanol plants were available within Zimbabwe from earlier ethanol plants. Capital equipment was primarily sourced from Brazil a technological leader in the field of ethanol production, and manufactured domestically. In sourcing equipment from Brazil sponsors ensured the project is unlikely to be compromised by the unavailability of spare parts or related equipment, as Brazil is not a participant in EU and US sanctions on the Zimbabwean government and its proxies.

Feedstock and key inputs

By partnering with ARDA in the sourcing of agricultural land, Green Fuel successfully aligned its interests with those of the state. This arrangement is particularly important owing to the vexatious land issue that remains in Zimbabwe. Despite the many protests and community reservations regarding the land acquisition process detailed above, Green Fuel has remained largely immunised from operational and political disruptions that these upheavals could potentially have triggered. The partnership also limited the capital injection into the project as the land was not purchased outright from ARDA, but is to be utilised over the 20-year concession period with enhancements made to the irrigation capacity and related cultivation infrastructure. Presently Green Fuel has approximately 10 000 hectares under sugar cane production in nearby proximity to the ethanol plant. Proximity of the crop to the plant enables a seamless and efficient logistical process, not subject to external transportation vagaries. Construction has included 13 feeder dams to store water for irrigation purposes and counter the effects of drought. Extensive irrigation

infrastructure has also been put in place. Independent farmers in the surrounding area also supplement sugar cane feedstock.

Market

The mandatory blending of ethanol into petrol commencing in August 2013 provides the equivalent of an off take agreement to Green Fuel by obliging petrol distributors to blend ethanol into their product at stipulated levels. As there are no other ethanol producers supplying the petroleum sector in Zimbabwe, this gives Green Fuel a captive market and monopoly position. Green Fuel's assurance of a market came to fruition when ZERA controversially issued a license to Green Fuel in terms of the Petroleum Act. This license enabled Green Fuel to be a registered supplier for the mandatory blending of anhydrous ethanol with unleaded petrol. Blending levels commenced at E5 at inception in 2013 and were subsequently increased to E10.

Foreign exchange and credit

When commencing investment and construction of the plant in 2009, the sponsors took advantage of the fact that inflation and exchange rate risk had effectively been eliminated by the dollarisation of the Zimbabwean economy. The venture would have been unviable under a hyperinflationary Zimbabwean dollar monetary system. The dollarized economy facilitated a natural hedge against foreign exchange risk as all factors of production including capital equipment, input, and output prices were denominated in US dollars. Part of the dollarisation reforms in Zimbabwe included liberalisation of both the current and capital accounts. Investors in the project could therefore legally transfer proceeds to external national jurisdictions to settle liabilities, distribute profits, or warehouse capital in more stable banking geographies. Owing to the opacity of this project, details in this regard were not accessible.

Political

Chisumbanje appears to have encountered and surmounted significant political risks. Under the Government of National Unity (GNU) in Zimbabwe that spanned the period 2008 to 2013 there were public disagreements between state officials and agencies regarding the project, including a parliamentary investigation and a set of recommendations by Deputy Prime Minister Arthur Mutambara. The recommendations made prescribed community restitution and compensation by the project developers, and a conversion of the project from a BOT to a joint venture,

with the state having a direct stake. The recommendations by the parliamentary committee were never implemented. This contestation further led to the blending regulations not being passed and the temporary closure of the plant. With Zanu winning an outright majority in the 2013 elections and the dissolution of the GNU, mandatory blending regulations were passed and the plant resumed operations. As highlighted in the regulatory section key questions remain regarding the integrity of the processes leading to Chisumbanje receiving its ethanol producer license, EIA, and exemption from local ownership requirements. The principal sponsor, Billy Rautenbach's close association with Zimbabwean President Robert Mugabe and Zanu (PF) saw him included on a list of individuals on whom EU and US sanctions and restrictions were imposed. The project missed an opportunity to sell carbon dioxide to South African listed and German owned African Oxygen. Despite a non-disclosure agreement, memorandum of understanding, and successful due diligence process, African Oxygen concluded it could not participate in the transaction due to it being 56% owned by the German Linde Group, that is subject to the Bribery and Corruption Act and related EU directives. Potential partners in Chisumbanje expressed the concern "what happens if …government changes, Mugabe moves, or even if Grace [Mugabe] becomes the new president, we don't know what the situation may be…". The life cycle of the plant is detailed below.

Table 4.10: Chisumbanje Ethanol Plant Life Cycle and Timelines

Project Life Cycle and Timeline	Date
Invitation to investors	2008
Granting of 20 year concession	October 2008
Beginning of construction	2009
Plant commissioning	2011
Receipt of blending license from ZERA	August 2013
Mandatory E5 blending requirements promulgated	August 2013

4.9.4 Institutional and legal arrangements

The key institutional and legal frameworks regarding Chisumbanje have been highlighted in the sections above. These include the BOT arrangement, the licensing of Chisumbanje as an ethanol producer, the EIA, and the role of ARDA in providing land for the project. Important considerations in the conceptualisation of Chisumbanje include the fact that Zimbabwe was in economic turmoil, and the ability to raise capital on large projects was limited by the country and many of its political actors having been effectively frozen out of the international banking system.

4.9.5 Lessons learned

Despite the controversy surrounding the Chisumbanje project, and gross irregularities in its commissioning, the venture offers key lessons for application. Beginning with the defects, the lack of a regulator at the time of the project's commissioning undermined the level of oversight. The failure of regulatory oversight is also evidenced by the fact that the EIA for the venture was never approved, and only granted by default. The Chisumbanje project is also mired in questions regarding the issuing of the ethanol production license. As a result, it was a subject of political contestation between Zanu PF and the MDC. The political nature of the project, including an overtly politically inclined principal sponsor has made the project more driven and dependant upon the country's fluid political environment, as opposed to a fundamental commercial and economic case. Chisumbanje demonstrates how the execution of project and infrastructure finance is significantly altered in countries that are in transition, where there is significant political and economic contestation, and the institutions and rules governing these societies are evolving. This may result in regulatory circumvention, a lack of transparency, and the collusion of state players in compromising the interests of local communities. Due to the tariff paid to Green Fuel and mandatory blending requirements, public opposition to the initiative remains elevated. This is also fuelled by the fact that on an individual basis the public would as of January 2015 be paying significantly less for imported unblended petrol.

The project also demonstrates non-traditional forms of capital raising, when ventures have limited access to conventional capital sources, including access to international capital markets. The most significant capital contribution to Chisumbanje in terms of value and utility is undoubtedly the land leased by ARDA for the development of the sugar cane plantations and to secure the plant feedstock. In arranging the project, the developers systematically sought to circumvent mainstream international banking and settlement platforms, and capital equipment sources from the EU and US, to shield the project from EU and US sanctions and potential disruption. The final lesson relates to the setting of a floor of US$ 0.75 for each litre of ethanol. Whilst the merits, amounts and processed followed in arriving at this decision may be questionable, this intervention provided a fundamental economic platform from which the project proceeded. A single case was examined in Zimbabwe rendering a comparison irrelevant. Detailed below is a summary of the case and its key attributes.

Table 4.11: Zimbabwe Case Compilation

Attribute	Chisumbanje Ethanol Plant
Geographic Source of Funding	• Geographic sources of funding outside of Zimbabwe unknown • Debt to equity ratio of project undisclosed • Evidence suggests limited use of debt on account of liquidity challenges in Zimbabwean banking sector, and international sanctions on major sponsor Billy Rautenbach
Nature of Equity Participants	• Domestic corporate/individual financial sponsor • Zimbabwean government through ARDA
Government Participation	• Government equity participation of 10% in recognition of ARDA lease of land to GreenFuel
Debt Funding Institutions	• Unknown
Use of International Service Providers	• Use of Brazilian advisors and technical experts in the plant construction
Time Commitment of Sponsors	• Full duration of project
Project Stage	• Initial project concept mature

Attribute	Chisumbanje Ethanol Plant
Business Landscape	• Project dependent upon the retention of mandatory blending requirements • Project dependent upon regulatory prescribed price of ethanol • Significant drop in oil price during 2014 and 2015 challenging the financial model and economic assumptions underpinning Chisumbanje • Project exposed to current and future community and political dynamics
Capital Structure Post Completion	• Capital structure unknown
Governance Structure Post Completion	• No significant changes
Significant Environmental/ Sustainability Incidents	• Multiple events recorded including aggrieved local community • Local disturbances resulting in violent confrontations and the deployment of police and army • Extended strikes by employees • Serious environmental breaches through the release of toxic effluent from plant
Risk Universe Dynamics	• Unstable and poorly managed
Refinancing Initiatives	• Non reported

4.10 Conclusion

This chapter began by documenting the selected case studies across four main criteria namely, the capital structure, and risk management. Having collated and considered data relating to each case and concluded in-country cluster comparisons, the chapter concludes with a referral to chapter 5, wherein a cross case analysis of all the cases is performed building on the format in which the case studies are organised. Specifically these categories are the governance, institutional, and legal arrangements, the risk management, and the financial structure. The environmental and sustainability considerations are examined as a fourth category separated from the risk management in chapter 5. This distinction is justified by the potential distress in the form of loss of human life and environmental degradation social and environmental breaches may cause to affected communities and environments.

5 Analysis and findings across the case studies

The case studies laid out earlier in the chapter document the uniqueness of each project, and the different factors shaping and influencing key project pillars. The 7 case studies set a foundation through which key assertions and insights relating to the governance (institutional and legal) arrangements, capital structure, risk management, and sustainability considerations were extracted from each case. In this section these key assertions derived from each individual case study are distilled, discussed, and cross-referenced across all the cases to determine each assertion's generalizability and limitations. The implications of the assertions on project and infrastructure finance are considered insofar as they contribute to project failure or success. As a result of the cross case analysis the thesis begins to distil and compare management practice in the execution of project and infrastructure finance, and commonality in practices begin to emerge together with proposals that have the potential to enhance project success if implemented. The cross case analysis also provides a platform for comparing actual managerial practice with academic theory in chapters 5 and 6, the reasons for deviation between theory and practice, and propositions to deepen our understanding of project and infrastructure finance in Sub-Saharan Africa. This analytical process was valuable in synthesizing and organising key and common themes, analysing these themes in defined units, and prompting the final arrangement of the research findings logically and coherently.

The key assertions derived from the battery of case studies are grouped into the categories of governance, capital structure, risk management, and sustainability in accordance with the research questions. Where assertions are applicable to more than one category they are allocated to the most profound and impactful category to limit duplication. The applicability of each assertion identified to each case study is ranked as significant (blue), relevant (red), or contradicted (yellow). Significant denotes that the assertion was derived directly from the case study. Relevant denotes that even though the assertion was not explicitly apparent in the case, it has direct applicability to it. Contradicted denotes a situation where an assertion in one case is contradicted by the actual arrangements of another case. Where an assertion is not applicable to a particular case, the 'block' is left unmarked.

The key to be applied for each assertion in Tables 5.1 to 5.4 is as follows:

Key:

S – Significant

R – Relevant

C – Contradicted

The names of the case studies have been abbreviated in the tables 5.1 to 5.4 as Seacom **(SE),** Gautrain **(G),** Pebble Bed Modular Reactor **(P)**, Kalkbult **(K)**, Mozal **(M),** Sasol Natural Gas Project **(S),** and Chisumbanje **(C)**.

5.1 Governance, institutional, and legal assertions across the case studies

Table 5.1 distils the governance assertions and the degree of transferability to the full battery of case studies. A cross case analysis of the governance arrangements in the case studies generates a number of valuable insights between successful and failed projects. The strength and credibility of the project developer is of critical importance. Projects including Seacom, the Gautrain, Kalkbult, Mozal and SNGP are characterised by project developers with deep technical capabilities complemented by strong balance sheets or ready access to capital. The strong technical capabilities mitigate against insurmountable engineering and construction challenges being encountered, and significantly improves the prospects of the project being successfully constructed. In contrast where project developers have limited technical capabilities or where the nature of the venture is a FOAK as in the case of the PBMR, the project is vulnerable to encounter engineering and construction impediments. The complexity of the PBMR engineering amplified this technical deficit contributing to its failure. Conversely in the Chisumbanje case, the developers also had limited technical experience. Ethanol production facilities on an industrial scale were however proven in Zimbabwe and other parts of the world with the process and technology being relatively easy to master.

Table 5.1: Governance, Institutional and Legal Case Study Assertions

Assertions from the case studies	Significance of assertions to each case study:						
	SE	G	P	K	M	S	C
A1. The strength and credibility of the project developer is essential to obtain buy in from other stakeholders including government decision makers, and the project to move from concept to pre-feasibility stage.	S	S	S	S	S	S	S
A2. Extensive project preparation prior to the commissioning of construction is critical to formulating a clear road map for the project that addresses potential hindrances, maps the project's critical path, and sets a foundation for the project's overall co-ordination and management.	S	S	S	S	S	R	R
A3. Effectively executed projects have explicit goals and objectives with attendant timelines established upfront, with progress closely monitored and evaluated at key milestones.	S	S	S	S	S	S	R
A4. A robust regulatory framework governing the project including the role of applicable agencies and public sector departments facilitates clear, effective, and efficient project execution. This includes where the project company is located and the attendant reporting lines.	R	S	S	S	S	S	S
A5. The utilisation of international advisers in legal, technical, financial and other areas enhance the robustness of the project particularly where the project is a first in a jurisdiction and domestic expertise are limited.	S	S	R	S	S	S	R
A6. Experienced project leaders are essential for the project management of projects from conceptualisation through to the operational stages.	S	S	S	S	S	S	R
A7. Project team continuity critical as project moves from concept, to feasibility, commissioning, construction and operations. A lack of continuity can result in major disruptions, elevated risk, and loss of institutional memory.	S	S	S	S	S	S	R

Assertions from the case studies	Significance of assertions to each case study:						
	SE	G	P	K	M	S	C
A8. Project sponsors must have ability to access key decision makers especially government officials and regulatory officers. Constructive engagements including effective lobbying for the project are essential.	S	S	S	R	S	S	S
A9. Where local partners are participants, these must be credible and effective in protecting the projects interests in the applicable jurisdictions.	S	S	S	S	S	S	S
A10. Robust, clear and documented governance arrangements including minority protection are essential for a stable governance structure, and conducive to long term equity participation by sponsors.	S	S	S	S	S	S	R
A11. The internal project company arrangements must be supportive of the project goals. This includes the mix between technical and commercial staff, the establishment of internal corporate capacity such as in risk management, human resources, and general operations. Qualitatively, the corporate culture that is nurtured should be aligned to fulfilling the project aims.	S	S	S	S	S	S	R
A12. A compact sponsor consortium enhances the speed and efficiency of the decision making process. This agility is diluted as the sponsor base or lending consortium broadens.	S	R	R	S	S	S	S
A13. Ensure strong project documentation. This will ease the speed at which the project can be executed on commissioning on account of the clarity, and attract debt-funding institutions due to the comfort derived from a rigorous documentation process.	S	S	R	S	S	S	R
A14. Strong co-ordination and organisation of project allowing all participants and stakeholders to be directed towards common objectives and instilling discipline and focus into project activities.	S	S	S	S	S	S	S
A15. Broad based political support increases the robustness and resilience of the project to political	R	S	S	S	S	S	S

Assertions from the case studies	Significance of assertions to each case study:						
	SE	G	P	K	M	S	C
changes particularly those relating to key personnel.							
A16. Where a public institution is a key sponsor or underwriter to a project, mechanisms need to be put in place to allow the public purse to enjoy financial upside beyond pre-determined return parameters. This omission may result in private sector operators enjoying super profits while the public sector bears the bulk of the risk.		S	S	R	R	R	S
A17. The long-term commitment of project sponsors to the full project life enhances the venture's robustness and the quality of long-term decision-making.	S	S	S	S	S	S	S
A18. Direct equity participation by the host government and representation on the project company board enhances project legitimacy and facilitates clear lines of communication with government principals regarding the project.		S	S		S	S	S
A19. The participation of multi-lateral institutions such as the IFC can enhance governance on account of the latter's extensive expertise in emerging markets and established relationships with many countries in Sub-Saharan Africa.					S	S	

In addition to bringing in Brazilian consultants in the plant construction and commissioning, the developers manufactured key plant components domestically and ensured skills transfer to the local management team to allow the plant to run independently. Therefore, despite limited technical capacity by the developer simpler and proven technology applied at Chisumbanje mitigated against the project failing on account of technical difficulties.

The duration of commitment of project sponsors has a significant effect of a project's resilience. Where sponsors are committed to a venture for its full project life, project resilience, stability, coherence and prospects of success are significantly improved. This is evident in Seacom, Gautrain, Mozal, SNGP, and Chisumbanje where sponsors do not have an exit strategy and are committed for the project's full life. This characteristic contributes to project success because sponsor decision-making is informed by the long-term success of the underlying project as opposed to short-term profit taking. The quality of sponsor decisions is therefore enhanced supporting both the success and longevity of a venture. As a juristic entity the project also benefits from having a stable core of sponsors frequently with strong balance sheets who can support the venture if it encounters temporary periods of financial or operational difficulty. This contributes to enhanced credit ratings and lower risk perceptions improving access to further capital requirements and the terms on which such funding is sourced. In contrast where a sponsors are equivocal in terms of their long-term participation in a project this injects a number of uncertainties.

The first is ambiguity as to whether a project concept will proceed to commissioning and execution. This doubt permeates the decisions of all stakeholders in the project who effectively hedge their bets anticipating that the project may never come to fruition, thereby diluting commitment and investment in their respective roles. This aspect was a clear contributor to the failure of the PBMR. Even where a project is constructed and commissioned, the exit of a key sponsor is likely to weaken the venture as external parties may suspect that the sponsor is exiting due to adverse insider knowledge of the project's prospects, and a new shareholder will lack the experience accumulated on the project to date. Despite the flaws inherent in Chisumbanje, a key contributor to its resurrection was the unambiguous and long-term commitment of the project sponsors.

Clearly and explicitly articulated project goals and milestones are an essential contributor to project success. This clarity of purpose originates

from the project sponsors through the governance structures put in place. While the explicit goals of Seacom, the Gautrain, Kalkbult, Mozal, SNGP and Chisumbanje evolved and were shaped during the project concept stages, finality on the project goals and scope were achieved before each venture reached financial closure. This allowed the sponsors to have a clear, definite and stable business plan to funders instilling certainty as to the project objectives and intended outcomes. Only when these primary goals had been achieved did the sponsors initiate brownfield or other value added extensions to the business model including venturing into backhaul operations by Seacom, enquiries to extend the Gautrain network by the GMA, and phase 2 of Mozal. The emphasis on explicit goals has the effect of focusing management attention on the objectives at hand and limiting distractions and diversions. Different participants and stakeholders are able to co-ordinate their responsibilities and deliverables towards common goals enabling congruence in project execution.

Such clarity facilitates for a sequential process of project commissioning, construction and operation in a disciplined, rigorous and purposefully myopic manner. On account of this rigour Seacom, Gautrain, Kalkbult, Mozal, SNGP, and Chisumbanje were also executed more closely in accordance within budgetary parameters further consolidating each project's prospects for success. In contrast the PBMR lacked clear and explicit goals. This contributed significantly to its failure by causing extensive re-engineering of changing plant specifications, poor co-ordination and co-operation amongst stakeholders and participants, unmet deadlines, and the incurrence of expenditure above budgeted amounts.

A transparent and certain regulatory framework enabled the commissioning of the five successful projects. Seacom obtained certainty regarding landing points in participating countries and the regulations governing this. Similarly, the legal framework for the Gautrain and Kalkbult was effected by way of legislation and corresponding regulations. The SNGP enjoyed the certainty expressed in the Gas Agreement with the South African authorities stipulating the terms by which gas could be imported into South Africa together with the pricing methodology, and Mozal enjoyed the benefits of explicit tax concessions and terms of being located in an industrial development zone. All these legal and regulatory interventions put in place by the host governments and state agencies gave legal certainty to the conditions under which these projects would operate. A failure by the respective state actors to issue these regulatory certainties would have resulted in all the above projects either not being commissioned, or being located in jurisdictions able to provide such

certainty. In contrast, the regulatory process for the PBMR was difficult, to some degree acrimonious, and unclear. This arose from the fact that the PBMR technology was novel and application was made to the regulator on completion of key component designs with the NER expected to approve qualifying submissions. A lack of clarity in terms of the regulatory standard was compounded by the regulator having limited experience, capacity and skills in assessing new design applications. The uncertainty regarding regulatory standards contributed to delays and increased costs, further jeopardising the PBMR. Similarly, for Chisumbanje, the absence of a regulatory authority on commissioning resulted in limited regulatory oversight on the venture and failure to compile regulations essential for its viability including mandatory blending. As Chisumbanje was temporarily shut down after construction as a lack of mandatory ethanol blending regulations resulted in no buyers of the end product.

Project team continuity was an assertion that projected itself forcefully in the successful execution of projects. In particular, the Mozal project illustrated the benefits that were derived from using the same project team that executed the Hillside and Bayside smelters in South Africa to execute Mozal. The synergistic benefits included both phases of Mozal being completed well within deadlines and budgets. Intentionality on project team continuity was also observed in Seacom, the Gautrain, Kalkbult, SNGP, and Chisumbanje. It was particularly important the more technically complex a project was and enabled the construction of institutional memory and skills retention. The five cases above that ensured project continuity were able to more seamlessly execute on the project in its different stages including conceptualisation, pre-feasibility, feasibility, financial closure, commissioning and construction, and operations contributing critically to project success. Where team continuity was lacking as in the PBMR institutional memory was compromised, mistakes were made and repeated, and project coherence and co-ordination were sub-optimal. These fault lines manifested in breached financial budgets and deadlines contributing significantly to project failure.

Internally within a project, the governance arrangements amongst sponsors and participants can result in project success or failure. Where multiple sponsors are involved as in the case of Seacom, Kalkbult, Mozal, SNGP, and to a lesser extent Chisumbanje, a clearly crafted shareholder agreement that all equity participants abide by increases the project's stability and prospects for success. While there were shareholder disagreements in all the above projects, the internal governance arrangements expressed how such matters would be engaged and

resolved internally, without compromising project operations. By way of example the importance of dividend declarations differed between different shareholders in Seacom and ROMPCO, but a solution that all shareholders agreed to was arrived at and these projects operations continued unabated. In contrast the PBMR suffered multiple setbacks regarding its governance arrangements. Specifically, the co-operation agreement with international participants was never implemented. Subsequently the international participants exited the venture and ceased to fund it. Finally, within South African government departments, Eskom, the DBSA, and the IDC, there was no overarching governance arrangement that all parties subscribed to. This disparate approach by stakeholders undermined overall commitment to the PBMR including financial, administrative and political support, delegitimising the project and setting it up for failure. ROMPCO in contrast initially had Sasol as a sole sponsor and shareholder. Such an arrangement enabled Sasol to make decisions speedily without the requirement to consult other shareholders in the construction of the pipeline. Coherence in the internal governance arrangements contributes importantly to successful project execution by facilitating an environment where sponsors and participants contribute fully and are committed to and invested in a project's success.

The governance arrangements in the above paragraph are also integrally linked to the importance of effective local and international partners in contributing to project success. Without effective local partners the Seacom developers would have been unable to obtain rapid regulatory approval for landing points in various countries. Similarly, the Gautrain project developers were able to access key decision makers and garner both political and government support.

A key enabler of both Mozal and the SNGP are the task teams involving government principals that were able to resolve bottlenecks and make decisions at the appropriate levels. Chisumbanje also demonstrates how project developers were able to obtain the participation of ARDA for significant land tracts and despite a turbulent political environment, ultimately receive an operating license and lobby successfully for mandatory blending. These projects illustrate the importance of local and international partners to enable a project and its success. In contrast, the South African principals were luke warm in their support for the PBMR and ineffective in garnering broad based political support. This ineffectual indifference contributed significantly to the termination of the PBMR. In addition, the international partners that were meant to facilitate access to American and British markets and regulatory approval exited the

collaboration rendering their contribution in these markets of no value. This greatly circumscribed the potential market for the PBMR, further undermining its financial viability.

The final consideration in factors contributing to project success and failure in the governance arrangements relates to the equity participation of host governments and DFIs. The Seacom and Kalkbult projects are the only projects where there is no direct or indirect state or DFI participation. This has not compromised the projects in any way, and may have contributed to the speed of execution. Seacom's lack of state equity participation is attributable to the fact that over 90% of the cable and related infrastructure is located in international waters and outside the jurisdiction of any single state. The Seacom developers would also have had a number of options as to where landing points occurred, reducing the need for state equity participation to obtain regulatory approval. The clear benefits of the cable for participating countries also meant political principals were attracted to landing points on their territories. Kalkbult could forego state equity participation as this was exchanged for community participation, and the state was an integral participant in the project by way of the PPA and guarantee to Eskom.

The project developers were also able to raise the capital required independently of state players or DFIs including using IRUs. In contrast all other projects had state or DFI participation. State support was essential for the Gautrain to be commissioned, as without it private sector players would have been unwilling to take on traffic risk. In addition, the government provided the bulk of capital. Due to its exploratory nature the PBMR required state support. Capital markets lack appetite for projects of this nature and the concept would not be developed without state funding. Having varying state participation in Mozal, SNGP and Chisumbanje is a strategic move aligning the interests of the project developers with the host government. This was particularly important where the host government oversaw critical project aspects including port infrastructure, gas reserve concessions, and land leases. Having state participation has enabled these projects to be protected from adverse regulatory and related interventions from the host governments, contributing to project stability and success.

5.2 Capital structure assertions across the case studies

Table 5.2 distils the capital structure assertions and the degree of transferability to the full battery of case studies. The first foundational observation made relates to the importance of deep and liquid domestic or

Table 5.2: Capital Structure Case Study Assertions

Assertions from the case studies	Significance of assertions to each case study:						
	SE	G	P	K	M	S	C
B1. The domestic presence of deep and liquid capital markets, enable the aggregation of savings that can be invested in capital-intensive projects. The absence of such markets result in capital scarcity and an inability of countries to fund infrastructure from domestic sources limiting development. Continued deepening and broadening of domestic capital markets including improved financial sector regulations contribute directly to increasing the available capital stock for infrastructure investment.	S	S		S	S	S	C
B2. Public resources are frequently a key catalyst in enabling project and infrastructure initiatives in developing markets. This intervention is more acute where domestic capital markets are narrow and shallow. The state's role as a catalyst extends beyond the provision of capital and may include implicit or explicit guarantees on patronage or mandatory utilisation of the product or service e.g. mandatory blending of ethanol.		S	S	S		S	S
B3. International and regional multi-lateral institutions such as the IFC and the DBSA participating in a borderline concept are essential in a project obtaining broader buy in by stakeholders and financial closure and commissioning being achieved.					S	S	C
B4. The participation of commercial banks and other related private debt providers who comprehensively scrutinise a potential venture and challenge the underlying assumptions allows a final project concept to emerge that is more robust and rigorous increasing prospects for success.	S	S	R	S	S	S	R
B5. Where possible and practical obtain capital for construction of venture from future users and related beneficiaries. This will have the effect of reducing debt levels, increasing the equity, and a generally more conservative capital structure more conducive to project success.	S	S	S	R	S	S	R
B6. For sponsor equity contributions, limit the usage of back leveraged structures. These structures have the effect of compromising long term decision making for a venture due to the need to service interest obligations on sponsor debt obligations.	S	R		R	R	R	R
B7. To increase the prospects of financial closure on a project, decrease the levels of leverage prior to	S	S		R	R	S	

Assertions from the case studies	Significance of assertions to each case study:						
	SE	G	P	K	M	S	C
actual construction i.e. as far as possible have a conservative debt to equity structure. Post construction where a venture's operations are stable and it is cash generative, leverage can be increased sharply and on commercially more favourable terms.							
B8. Project developers will need to take full pre-construction risk where governing authorities and banks cannot accept this risk burden. This wholesale take on of risk can be unwound in stages post construction and after the project has reached a steady state in its operations permitting the entry of new equity and debt participants.	R	R	S	S	R	S	S
B9. A key aspect of a project's feasibility should be a clear, stable, reliable, and predictable funding model. Ideally the funding mandate should not be subject to recurring authorisation once made e.g. national budgetary allocations. Unfunded mandates jeopardise a project from the onset, as stakeholders are non-committal towards ventures that can be summarily terminated.	S	S	S	S	S	S	S
B10. Embed mechanisms into debt funding arrangements that allow for refinancing of debt where justified without excessive breakage fees in debt package.	S	S		R	S	S	R
B11. Immunise or hedge the capital structure from foreign exchange movements. Floating exchange rates in Sub-Saharan Africa are volatile and hedging against these movements in the capital structure permits focus on the operational performance of the underlying project. Traditional banking hedging products are likely to be prohibitively expensive and hedging will of necessity need to occur through novel enabling mechanisms including the Treasury and the Central Bank.	S	S		S	S	S	S

regional capital markets to enable funds to be channelled towards potential projects. The Seacom venture made effective use of South African capital markets in raising all its debt funding requirements, and 50% of the equity funding. South African capital markets are acknowledged as the deepest and most advanced on the African continent. In the absence of funding from South Africa the project developer would have incurred significant difficulty in sourcing the requisite funds from other capital markets in Sub-Saharan Africa. Alternatively, the project developer could have opted to source funding from outside Sub-Saharan Africa. This would likely have resulted in an extended capital raising exercise that would have substantially transformed the transient opportunity that Seacom sought to monetise. At best the Seacom project would not have been executed in its original form and within the time frames achieved. At worst, failure to raise overseas funding may have resulted in Seacom not reaching financial closure. The regulations governing the REIPPP prescribed the sourcing of debt funding from South African banks. Project developers were therefore restricted largely to deciding on an optimal debt to equity mix. The Mozal and SNGP encountered capital market deficiencies in Mozambique. To circumvent these and ensure the ventures progressed the Mozal project made extensive use of an international funding consortium including the IFC and the IDC. The absence of these international funding sources would have stymied the project at conception. Similarly, the project sponsor of the SNGP primarily mobilised capital from South African capital markets, in addition to their own balance sheet. The SNGP would not have reached financial closure in the absence of these funds. To a lesser degree the Gautrain made use of commercial debt funding from South African banks. The less than 10% of capital provided by the banks infers that the project would have progressed even without this injection. Similarly, in the case of the PBMR, funding from capital markets was negated by state funding as raising debt on a FOAK project was impractical. The Chisumbanje project is an anomaly. As highlighted in the case study, Zimbabwean capital markets were unable to raise the requisite capital. Zimbabwe was also barred from accessing funds from international multi-lateral institutions including the IMF, World Bank and IFC. The injection of capital by private actors seemingly linked to political principals furnished the funding for Chisumbanje. The project would have failed to materialise where private participants employed their own capital to underwrite the project, and if overt political support for the project was not in place. The embryonic nature of capital markets in many Sub-Saharan African countries are a significant barrier to large capital-intensive projects.

With the exception of Seacom the cases indicate that large infrastructure or commercial projects are difficult to execute in the three countries without public resources or funding acting as a catalyst.

The Gautrain was capitalised by the South African national and provincial governments for almost 90% of its overall funding requirements. Had the state not capitalised the Gautrain to this degree the venture would not have been commissioned. Similarly, the PBMR was almost wholly reliant on direct or indirect government funding in its attempt to commercialise its reactor concept. No private sector organisation would have funded the exploratory work that was the PBMR. The SNGP made use of natural gas resources in Mozambique that are technically owned by the state. The Mozambican government's issuance of a concession at Temane was essential to the project, without which the project could not have proceeded. While Mozal did not require a resource concession, the state in essence enabled the project through significant tax concessions that ordinarily would have been levied. Without these generous tax arrangements, the attractiveness of smelter in Mozambique would have been outweighed by the risks of locating the plant in an untested frontier market. State resources in the form of land made available by ARDA were essential for the execution and on-going operations of Chisumbanje. Chisumbanje would not have been viable without the land lease feedstock for the plant would have been inadequate. Seacom is an exception to the observations above due to the internationalised nature of the project, and the fact that it provides an intangible service proven to be robust and funded by private sector operators alone in many parts of the world.

In frontier markets hobbled by underdeveloped capital markets, the participation of multi-lateral institutions is valuable in broadening the funding consortium and attracting the requisite capital. The Mozal and SNGP projects both made use of IFC funding to varying degrees. In the case of Mozal, the absence of IFC participation would have resulted in other international capital providers not joining the funding consortium, and as a result the project failing to reach financial closure. The SNGP would have progressed without the capital injected by the IFC if this was the only consideration. Non-participation in totality by the IFC would have severely jeopardised the commissioning as the political umbrella the IFC gave the project was invaluable. It is also reasonable to argue that had Mozal not been executed and set a precedent that international investors could securely develop projects in Mozambique, the SNGP may never have been commissioned.

The developed nature of South African capital markets negates the catalysing impact of DFIs such as the IFC. This is evidenced by the fact that no IFC or international DFI funding was used on Seacom the Gautrain or the PBMR. The participation of commercial banks by way of debt funding is highly advantageous to a project. The due diligence conducted by banks to determine a project's commercial rigour including the financial model and forecast cash flows results in safeguards being embedded into the project structure during funding negotiations. Legal and related due diligences also means that the project is evaluated by seasoned bankers in areas including regulatory and environmental compliance extending the probing to other essential aspects not directly related to the capital structure. In each of the Seacom, Gautrain, Kalkbult, Mozal and SNGP projects that underwent commercial banking scrutiny, the unfavourable deviation in forecast financial performance versus actual is insignificant and inconsequential. This indicates project assumptions and modelling were largely accurate and in the case of the Gautrain even conservative in terms of patronage.

These conservative assumptions to a large degree originated from bank funders. They had the effect of making the underlying projects more realistic and resilient in the event of underperformance by building in a buffer in the event of underperformance. In contrast the PBMR lacked such rigorous scrutiny and input by funders. This lax funder regime and oversight resulted in costs and deviations from set financial parameters and milestones being flouted with limited consequences. These continual breaches culminated in ballooning cost incurred by the sponsor and a withdrawal of support for commercialisation due to a lack of confidence that the venture would achieve the anticipated outcomes and the excessive funding requirement. In the case of Chisumbanje, the lack of accountable debt funders enabled the project to be commissioned in the absence of regulatory clarity on mandatory blending, the EIA, and despite a challenging political environment. As a result, Chisumbanje was mothballed when these regulatory hurdles were not resolved due to gridlock regarding the project in the government of national unity. The 2013 election in which Zanu PF won an outright majority and proceeded implement the outstanding regulations led to the project's resurrection. Commercial bankers would have withheld funding until these matters were resolved and prevented the plant lying idle for an extended period. Paradoxically, had Chisumbanje been entirely dependent on commercial bank funding on traditional terms, the plant would never have been constructed as banks had no appetite for a project with such a risk profile.

An important consideration in the capital structure arrangements of projects is the use of back leveraged structures where some sponsors are unable to put up their full equity contribution. Back leveraged structures were utilised by a minority of sponsors in the Seacom transaction. Whilst not sabotaging the project the back leveraged structures had the effect of increasing the contestation between sponsors on the amount and frequency of dividend declarations. This distracted from the long term strategic plans of the venture. The Seacom example is instructive in demonstrating the potentially divisive effect of back leveraged structures amongst sponsor consortiums. Back leveraged structures were effectively avoided on ROMPCO by deferring the participation of iGas and CMG to post construction, and Sasol putting up the full equity cheque. Where this is possible, this arrangement would appear more preferable. The other cases have an absence of back leveraged structures indicating the strength of the project sponsors and a possible aversion to back leveraging based on the disadvantages detailed above.

The degree of proposed leverage in project conceptualisation has a significant influence in reaching financial closure. Highly leveraged projects imply limited skin in the game by project sponsors and an elevated risk profile. Conversely lower leverage decreases the risk for debt funders on account of the increased equity contribution from sponsors. The conservative debt to equity ratios observed in Seacom, Gautrain, ROMPCO, and Mozal relative to other project finance transactions infer that the sponsors sought to derisk the projects through higher equity injections. These actions made the projects viable in terms of their ability to attract debt funding for the remaining capital requirement. Project developers may sabotage a project achieving financial closure if leverage is based on developed market comparatives such as debt to equity ratios 75%: 25%. To finesse a project past financial closure in emerging and frontier Sub-Saharan markets, more conservative debt to equity ratios are frequently required.

It is highly probable that Chisumbanje was substantively premised on this principle due to the difficulty it would have encountered in raising debt capital. Post construction, it is notable that Seacom, ROMPCO, and Mozal enacted more aggressive leverage. This development arose due to the fact that operational projects that are cash generative represent a substantially lower credit risk. Commercial banks would have been far more amenable to advancing credit on better terms on post construction operational projects, and the latter three ventures took advantage of this market reality. Refinancing of project debt on more favourable terms after

construction is a feature that should be built into the project architecture. In this respect project developers must negotiate funding terms that are amenable to refinancing without excessively punitive breakage fees.

A clear and predictable funding model informed in part by the capital structure differentiates successful and failed projects. Seacom raised upfront capital and tied in customers via IRUs. Other channels of annuity income were generated through on-going sales of bandwidth in the wholesale market. Despite new entrants and steep declines in data prices, income streams were maintained by increased volumes ensuring the venture was commercially viable. The Gautrain had conservative forecasts for revenue generation via patronage underwritten by the Gauteng Provincial Government via the MRTR giving the operator a clear and reliable funding mechanism. Revenue for Kalkbult, Mozal and SNGP was made certain by strong and credible off takers in the form of Eskom, Mitsubishi and Sasol respectively. These revenue streams informed both the capital structure and funding model contributing significantly to project success. In contrast annual allocations of funding by sponsors of the PBMR were unclear and decided upon annually with no firm and explicit commitment beyond. Further contributing to project failure was the fact that the forecast sales of reactors proved to be extremely overly optimistic and premised on flawed logic and assumptions. A combination of terminated funding and insufficient demand culminated in the funding model flaws being exposed and project collapse. Similarly, with Chisumbanje, the failure to effect mandatory blending regulations led to the facility's closure, as there was no effective off taker and concomitant revenue. Only the passing of blending regulations and the subsequent revenue streams allowed for Chisumbanje's resurrection.

The final consideration in the capital structure arrangements is the need to immunise the capital structure (and project operations) from exchange rate volatility. Seacom's operations had a built in hedge with most income and costs being dollar denominated. In the case of the Gautrain, the foreign exchange risk was taken on by National Treasury and the South African Reserve Bank in their roles as institutional enablers. Kalkbult debt was sourced in South Africa and denominated in rands, as was the PPA. Mozal and SNGP embedded natural hedges into the project arrangements at conception while dollarisation in Zimbabwe made foreign exchange risk redundant for Chisumbanje. A failure to immunise a project from foreign exchange risk could scupper its viability in two ways. Firstly, commercial hedging instruments may be excessively costly and derail economic

viability. Secondly banks may balk at advancing facilities on a project with naked foreign exchange risk.

5.3 Risk management assertions across the case studies

Table 5.3 distils the risk management assertions and the degree of transferability to the full battery of case studies. Underpinning all the successful projects is a clear regulatory framework established prior to project commissioning. This framework includes a prescribed process of project commissioning including time frames for feedback and ultimate decision-making and selection. Seacom ensured regulatory approvals were in place for landing points in participating countries even though not subject to one overarching national jurisdiction. Kalkbult was executed within the parameters of the REIPPP, and the Gautrain was established and regulated via the Gautrain Management Agency Act and PPP regulations, and subject to other rules. The Mozal sponsors ensured the tax regime and terms of the industrial development zone were contractually agreed upon at project conceptualisation, while the SNGP obtained certainty on the regulatory framework through the Gas Sales Agreement, two Pipeline Agreements, a Regulatory Agreement and a Product Sharing Agreement with the South African and Mozambican governments. In contrast the exploratory nature of the PBMR necessitated that regulatory appraisal could only be conducted after the project developers submitted a component design. The regulator had the power to reject submissions or send them back with amendments required. Such a process is arguably unavoidable on FOAK nuclear energy projects. If not managed effectively, they result in extended development times and increased costs. This was exactly what occurred in the regulatory approval process on the PBMR contributing to project failure. In the Chisumbanje case two key regulatory oversights are observed. The first is the absence of mandatory blending regulations on plant commissioning resulting in the plant lying redundant after completion. The second is the non- approval of the EIA.

The continuance of the project despite the absence of EIA approval has contributed to the on-going and unresolved community resistance to the plant that has occasionally turned violent and required the intervention of the law enforcement authorities.

Table 5.3: Risk Management Assertions

Assertions from the case studies	Significance of assertions to each case study:						
	SE	G	P	K	M	S	C
C1. For both national authorities and project developers, a clear and transparent regulatory framework laying out a prescribed process of project commissioning including time frames for feedback and ultimate decision making and selection. Such transparency significantly reduces the probability of corrupt practices and contributes to national authorities achieving more competitively priced and efficient projects. Project developers have greater certainty as to how the process will unfold and certainty as to when decisions will be made.		S	S	S	R	R	S
C2. Where state procurement is involved the adjudication methodology to be applied including the respective weighting per category should be disclosed in advance. All bids received submitted should be evaluated on these criteria and the results disclosed for both successful and losing bidders. Such probity increases perceptions of legitimacy and fairness, and communicates clearly how successful bidders were superior to losing bidders.		S		S	R	R	S
C3. State actors should support credible, capacitated, and independent oversight and regulatory bodies shielded from political influence. The impartiality and effectiveness of regulatory bodies improves the quality of projects authorised and the quality of oversight conducted on ventures in operation.	R	S	S	S	R	R	S
C4. Embed risk management into the project conceptualisation and construction design, as opposed to implementing risk management initiatives after project commissioning. Such a process results in more effective and economically efficient risk management execution.	S	S	S	S	S	S	S
C5. Institutionalise the risk management function as a dedicated department covering all aspects of project operations for holistic, proactive, and co-ordinated risk management.	S	S	S	S	S	S	S
C6. Comprehensive, credible and genuine EIA and EMP processes including public participation processes. Executed properly this enhances the legitimacy of the project and reduces the likelihood of legal, regulatory, and community challenges to the venture making it more robust.	S	S	S	S	S	S	S

Assertions from the case studies	Significance of assertions to each case study:						
	SE	G	P	K	M	S	C
C7. Recognised and trusted avenues for complaints and recourse by affected stakeholders especially individual and community concerns. A failure of these structures may result in violent disturbances disrupting project operations.	S	S	R	S	S	S	S
C8. Institutional and regulatory flexibility by state agencies. This assertion proposes that governments exercise their constitutional prerogative judiciously in removing bottlenecks or implementing enabling mechanisms required on large-scale infrastructure and commercial projects. The mitigation of these risks makes the underlying project viable.	R	S	R	R	S	S	S
C9. Project developers must establish a dedicated communications capability particularly to address public concerns and complaints. This responsiveness and visibility is essential as large-scale projects are by nature disruptive particularly during construction.	R	S	R	S	R	R	R
C10. Education of key decision makers coupled with lobbying where required. This intervention allows project developers to communicate the benefits of the venture and to influence policy makers in such a manner that they do not inadvertently make decisions detrimental to the project.	S	S	S	S	S	S	S
C11. Link operator compensation and incentives such as tax concessions to operational metrics. This intervention provides a clear monetary incentive for the operator to manage project risks.		S	S	S	R	R	R
C12. While risks are delegated to subcontractors who can best manage them, the project team should confirm and establish that the parties to whom the risks have been subcontracted have the capacity to manage these risks.	R	S	R	S	R	R	R
C13. Each risk should ultimately have a single risk owner for clear responsibility and accountability.	R	S	R	R	R	R	R
C14. The composition of the project team and company between technical and commercial personnel must be carefully calibrated to ensure a blending of technical progress and oversight, within acceptable commercial parameters. The corporate culture of the project company must be able to integrate the frequently competing and conflictive demands of technical and commercial principals.	S	S	S	S	S	S	R

Assertions from the case studies	Significance of assertions to each case study:						
	SE	G	P	K	M	S	C
C15.Host governments should have a significant investment in the project either by way of direct participation or indirect stakeholder interest. This increases the project's resilience to adverse unilateral interventions by host governments.		S	S		S	S	S
C16. Institutional enablement in the form of for example patronage guarantees or foreign exchange risk facilitation by public institutions derisks projects to the extent that previously unviable ventures become doable.		S	S	S	S	S	S
C17.Maintain a competitive bid process on procurement so as not to be exposed to a single solution provider until a final decision is made as to the winning bidder. This may require the project developer to bear some of the bid costs. Such expenditure is outweighed by the qualitative and financial benefits that accrue from competitive bidding.	R	S		S	R	S	R
C18. Ensure the project is arranged such that there are alternatives to European and North American capital equipment, payment systems, funding, and markets. This makes the project resilient to economic sanctions arising from geopolitical differences.	R	R	R	R	R	R	S
C19. Project developers should proactively share the credit for the project with local principals particularly regulators, state agencies and politicians. This engenders deeper support from decision makers, and broadens the base of supportive stakeholders.	S	S	R	S	S	S	S
C20. The participation of multilateral institutions including the World Bank and IFC continue to have a halo effect on a project especially where it is being commissioned in a frontier market perceived to have elevated risk. Such institutions participation is often catalytic.					S	R	

This public rejection of the plant may seriously compromise its social license to operate. In projects where the state is directly commissioning the project and undertaking the procurement such as the Gautrain, the regulatory framework should articulate the procurement process including adjudicating methodology. The procurement process should also build in transparency mechanisms including making selected submission documents available to the public and disclosure on the factors informing winning and losing bidders. These practices decrease the possibility of corruption and gives project developer's greater certainty as to how the process will unfold. It is notable that Seacom, Gautrain, Kalkbult, Mozal, SNG, and Chisumbanje effected competitive bidding and procurement processes. Competitive bidding processes were advantageous in not only reducing the cost of capital equipment, but also in mitigating the risk of over reliance on one equipment or service provider. Supporting the regulatory frameworks above requires credible, capacitated, oversight bodies within the project and at national level. The Seacom, Gautrain, Kalkbult, Mozal and SNGP projects institutionalised risk management within each project by way of dedicated teams or committees. These units embedded risk management into all stages of the project from conceptualisation to operations. In contrast the risk management function in the PBMR was established 7 years after project commencement. This contributed directly to a failure to flag and remedy glaring risk occurrences that crystallised into project killers. A dedicated and independent risk management team does not appear to have been put in place at Chisumbanje. This observation, and the failure of the project team to act, account for the community challenges and environmental breaches that have occurred and continue to threaten the project. At a national level the GMA acts in managing risk and conducting oversight over the Bombela Consortium that operates the Gautrain. Seacom sits under the auspices of the Independent Communications Authority of South Africa insofar as South African business affairs are concerned. The PBMR falls under the ambit of the Nuclear Energy Regulator. These institutions have significant resources to carry out their regulatory and oversight mandates. In the case of the Nuclear Energy Regulator, its skills and capacity to vet and approve FOAK nuclear developments is arguably questionable. The SNGP fell under the National Energy Regulator of South Africa, and the DoE who regulated and oversaw the South African portion of the project with equivalent institutions in Mozambique. Chisumbanje's deficient oversight regime is significantly attributable to the fact that the Zimbabwe Energy Regulatory Authority had not been established when Chisumbanje was commissioned. As a result, attempts at retrospective regulation have been somewhat difficult. Projects that conducted comprehensive, credible and

genuine EIA and EMP processes are less susceptible to social and environmental breaches and concomitant disruption. Seacom, Gautrain, PBMR, Mozal and SNGP conducted these processes thoroughly, in part due to the rigorous South African legislative framework on these issues. Despite a number of legal challenges and occasional problems, these projects have retained their legitimacy and social license to operate. In contrast the Chisumbanje project circumvented EIA approval through a technicality and political manoeuvring and suffers on-going public contestation and a lack of legitimacy. This led to the project being mothballed during the government of national unity, and makes the venture vulnerable to political events. A key mitigator in managing community risk is a dedicated communications capability particularly to address public concerns and complaints. This responsiveness and visibility is essential as large-scale projects are by nature disruptive particularly during construction.

Institutional and regulatory flexibility are essential in a number of the case studies both for risk management purposes but also to enable projects to proceed. The Gautrain could not have proceeded without the provincial government agreeing to underwrite the patronage levels. Similarly, the project may have been stymied if the provincial government had been compelled to purchase expensive foreign exchange hedging instruments, the latter risk being shouldered by the Treasury and Reserve Bank. The PBMR would also not have proceeded beyond the concept stage in 2000 without significant financial support from government and a handful of political principals. In the absence of the Gas Regulatory Act, the South African government signed Regulatory Agreement with Sasol enabling the project to go ahead with certainty as to the regulatory regime. Similarly, in the case of Mozal the Mozambican government intervened in the port clearing and customs function to ensure that imports and exports were processed efficiently through the harbour, and bonded warehouse facilities could be established at Mozal. The Zimbabwean authorities were essential in enabling Chisumbanje with land from ARDA without which the project would not have materialised. These observations highlight the importance of the state in mitigating risk and creating a conducive environment for project execution.

The quality and frequency of communication with stakeholders appears to contribute significantly to educating stakeholders and promoting the project at hand. The Seacom principals actively communicated the benefits of the project to decision makers across participating countries and have continued to lobby or the ventures interests. This has been

important not only in the venture's establishment but also in addressing bottlenecks in backhaul networks, monopoly practices, and regulatory impediments. The GMA proactively set up a dedicated and well-staffed communications team including in electronic, print, and social media that promoted the Gautrain. Similarly, the sponsors of Mozal and SNGP trumpeted the benefits accruing to Mozambique of the two projects to engender government and public support. By way of contrast the PBMR never had a communications function in place to inform and educate the public on the venture. Initially media support for the project was strong but when this turned to criticism the public latched onto the negativity. Similarly, the Chisumbanje communications function was limited to the community in which the project was located. This was despite the fact that the project had national ramifications. Because the project has been negatively received, the communications function is largely defensive in posture, heading off the attacks on the project, and not marketing its positive attributes. A final and important part of the communications process is for project sponsors to share credit with local partners especially key public decision makers and politicians. This was abundantly clear in the execution of Seacom, the Gautrain, Mozal and SNGP. Sharing credit was virtually non-existent with the PBMR and Chisumbanje on account of the negativity attached to these projects.

A key risk management device devised and implemented in the Gautrain project is to link the MRTR compensation of the operator to operational performance metrics. This mechanism incentivised the operator to fulfil performance metrics failing which its compensation would be adversely affected. While this mechanism was only applicable to a single case in this thesis where the state retained ownership of the assets but outsourced the management, it has broad implications for similar arrangements, and PPP across the world.

The penultimate risk management assertion emerges most strongly from the Chisumbanje case. The project context dictated that the venture responds to geopolitical constraints including sanctions on the country and primary project sponsor. The project sponsors circumvent sanctions and protect their venture from external interference in four key ways. Firstly, funding for the project is raised from private investors as opposed to international DFIs, multilateral institutions, or commercial banks subject to international banking regulations. Secondly, the project sources capital equipment from South America, a region of the world generally not party to EU or American sanctions, but also with world leading ethanol plant engineering and technical capability. The project output is targeted at local

markets only neutralising the threat of foreign markets being compromised. The fourth risk management intervention appears to have been the circumvention of international payment systems including SWIFT allowing financial transactions enabling the project to occur. These risk management interventions are instructive for project developers in Southern Africa where relationships with the EU (and Britain in particular) and the USA have proven to be volatile. Project architects would be advised to consider designing projects with alternative funding, markets, capital equipment and payment systems in mind should geopolitical events warrant this for a venture's survival.

The criticality of using international legal, financial, technical and related advisers in the risk management process has been articulated in the Governance Assertions above. Similarly, the commercial and technical composition of the project team, the continuity required to enable effective risk management, and the delegation of risk to a single project owner to enable a successful project have been captured in the Governance Assertions and will not be duplicated.

5.4 Sustainability assertions across the case studies

The sustainability assertions captured in Table 5.4 across the case studies echo a number of the observations made in the governance and risk management assertions. They are however punctuated by prospective action and sustainability interventions measures that may not have been explicitly performed within the 6 case studies, that contain real resonance if applied. As highlighted in the risk management assertions, comprehensive, credible and genuine EIA and EMP processes enhance the legitimacy of projects and reduce the likelihood of legal, regulatory, and community challenges to ventures. This is evidenced in Seacom, Gautrain, Kalkbult, Mozal, SNGP, and PBMR, while severely lacking in Chisumbanje with concomitant disturbances on the project.

One of the important observations in all the projects with the exception of Chisumbanje is that sustainability is designed into the project architecture at the conceptualisation phase. As such key environmental and social requirements are integrally woven into the project's architecture reducing the prospect of sustainability breaches, oversights or omissions. These projects included in the EIA process many qualitative factors and notably local community sensitivities in the form of ancestral burial sites and places of cultural and religious significance. The project architecture was accordingly designed to avoid inflaming identified sensitivities.

Table 5.4: Sustainability Case Study Assertions

Assertions from the case studies	Significance of assertions to each case study:						
	SE	G	P	K	M	S	C
D1. Comprehensive, credible and genuine EIA and EMP processes including public participation processes. Executed properly this enhances the legitimacy of the project and reduces the likelihood of legal, regulatory, and community challenges to the venture making **it** more sustainable.	S	S	S	S	S	S	S
D2. Recognised and trusted avenues for complaints and recourse by affected stakeholders especially individual and community concerns. A failure of these structures may result in violent disturbances disrupting project operations.	R	S	S	S	S	S	S
D3. Embed sustainability considerations into entire project architecture from conceptualisation and construction design to operations, as opposed to implementing sustainability initiatives after project commissioning. Such a process results in more effective sustainability compliance and execution.	S	S	S	S	S	S	S
D4. Beyond the generic processes of the EIA process, project developers need to understand local sensitivities. These may include issues of significant cultural and religious import such as ancestral burial sites, or colonial legacies including land ownership. Projects must be designed to adequately address these human concerns.	S	S	S	S	S	S	S
D5. In evaluating the sustainability credentials and merits of a project, stakeholders need to carefully consider the imbalance in power relations between project developers and communities, especially rural communities.	R	S	R	S	S	S	S
D6. The manner in which normative rules such as the Equator Principles are arranged including self-regulatory mechanisms limits the reliance regulators and oversight agencies should confer on them.	S	R		R	S	S	R

Assertions from the case studies	Significance of assertions to each case study:						
	SE	G	P	K	M	S	C
D7. States and regional bodies need to establish enforcement authorities and powers for compliance with normative rules with clear legal ramifications in the event of non-compliance for such rules to be fully effective.	R	S	S	S	S	S	S
D8. Countries need to standardise sustainability rules and regulations across regions and economic communities e.g. SADC, COMESA, and the EAC. This will reduce regulatory arbitrage on sustainability requirements, set clear and consistent standards, and support regionally based ventures.		R			S	S	S
D9. Incentives and compensation paid out by national authorities and agencies should be directly linked to compliance with sustainability regulations creating clear financial inducements to comply.		S	R	S	S	S	S
D10. Holding companies should be stripped from limited liability provisions if a subsidiary breaches sustainability provisions but lacks the financial means to make full compensation.	R	R	R	R	S	S	S
D11. Regional (SADC) censure for serious environmental and sustainability breaches in the form of license withdrawals, fines, compensation, and loss of license to operate.	R				S	S	S
D12. For sustainability activists, a focus on the project company stakeholders in embedding and complying with sustainability obligations. This approach is particularly attractive for listed multi-national companies with high public profiles and brand recognition.	S	R	R	R	S	S	S
D13. The state is frequently party to contraventions of community rights. As such mechanisms to hold the state accountable for such dereliction of duties and for communities to receive compensation from the state itself.		S	S	S	S	S	S
D14. Transparency must be achieved regarding how the government applies the financial benefits derived from the project. This is important so that stakeholders and local communities in particular feel the direct benefits of the project. Limited transparency increases the probability of project income being misdirected		S	S	R	S	S	S

Assertions from the case studies	Significance of assertions to each case study:						
	SE	G	P	K	M	S	C
as a result of corruption, community members enjoying indiscernible benefits, and the venture's legitimacy being compromised.							
D15. Significant local equity participation (in addition to state ownership) in underlying projects. This enhances community buy in, increases the prospects of economic benefits of the project flowing directly to the community, and gives the community representation at board level and related subcommittees.	R	S	R	S	S	S	S
D16. A collaborative tension between project developers and environmental activists and NGOs whereby information is shared and remedies sought where potential sustainability deficiencies are encountered.	R	S	S	R	S	S	S
D17. Where possible limit the environmental footprint of a project by building on existing infrastructure channels e.g. a pipeline parallel to a highway or clustering of nuclear facilities.	R	S	S	R	S	S	S

Limiting the environmental footprint of a project may also be achieved by building the venture parallel to existing infrastructure where possible. Significant portions of the Gautrain were constructed juxtaposed to existing highways. The PBMR prototype was envisaged to be located within the confines of the existing Koeberg power plant, while phase two of Mozal was located in the same industrial park as phase 1. Even the Chisumbanje plant was constructed in close proximity to existing sugar cane fields and ethanol blending plants. Whilst parallel infrastructure was limited to guide the SNGP, the laying of the pipeline underground was an intentional strategy to limit disrupting farming activity and wildlife, together with reducing the risk of sabotage, hence making the venture more sustainable.

Across the case studies the efficacy of normative rules including the Equator Principles was arguable. While the normative rules are valuable across all projects with the exception of PBMR and Chisumbanje, practitioners treated them as 'hygiene' issues. Legal and technical compliance were required to ensure project progression, with limited investment beyond having achieved these objectives. The sound business practices of the project developers in Seacom, Gautrain, Mozal and SNGP resulted in no significant sustainability breaches in these operations. The lack of enforcement capability in the normative rules however contributed greatly to them being viewed as purely 'hygiene' issues. In this respect the self-regulated normative rules are woefully inadequate.

As discussed in the risk mitigation section, on-going education of stakeholders coupled with communication can manage negative public sentiment towards a project particularly in the construction stage. Winning over public support for a project together with key decision makers enhances a project's sustainability by reducing hostility towards it. Project sponsors at Seacom, Gautrain, Mozal, and SNGP engaged in comprehensive public engagement processes in various project stages contributing to success. In contrast public education and communication were stilted in PBMR and Chisumbanje that culminated in negative public sentiment undermining their legitimacy. Project teams can also develop collaborations with environmental activists and regulatory bodies. While these relationships will understandably be characterised by contestation on issues, the sharing of information will enrich the project teams understanding of its strengths and weaknesses in adhering to sustainability regulations. The imbalance in power relationships between project developers and communities can be huge impediment to attaining equitable sustainability arrangements. Frequently project sponsors are

multi-national corporations with sizeable balance sheets. They are able to mobilise large teams of legal, financial, technical and related resources globally. Their size and prominence gives them access to decision makers including ruling political classes in host countries and in their countries of origin. In contrast communities in which these projects are executed in Sub-Saharan Africa are rural, impoverished, and of limited education. This reality requires specific interventions in African markets to attain reciprocal sustainability provisions by project developers at on par with those in developed markets. Mozal, SNGP, and Chisumbanje are illustrative of projects occurring in impoverished rural communities where power relationships heavily favour the project developer. The following proposals attempt to facilitate more equitable power and therefore negotiation relationships. The research findings infer that sustainability arrangements in projects would be strengthened by the codification of normative rules into binding laws with accompanying prison terms and fines if breached. Complementing this initiative, economic and regional unions such as SADC, COMESA, and the EAC need to standardise these environmental laws. Standardisation reduces the likelihood of regulatory arbitrage by developers in locating a project in one country as opposed to another. It also simplifies sustainability compliance for project developers where the underlying venture is cross border in nature as in Seacom or SNGP.

State incentives granted to project developers such as rebates, tax exemptions, and other monetary inducements should be conditional on meeting and on-going compliance sustainability with predetermined sustainability targets. In similar respect, limited liability provisions in a project company should be rescinded where serious environmental and sustainability breaches occur allowing injured parties recourse to compensation from the project sponsors and their respective holding companies. To broaden the focus on sustainability compliance, regulations may also support recourse claims to include banks funding a project. The latter would compel banks to assess and monitor sustainability compliance in clients. The role of the state as a prime culprit in committing environmental and social violations needs careful assessment. Due to the almost overwhelming depth of resources and bureaucratic hurdles that the state may deploy to stymie lawsuits of this nature two key measures are required. The first is to set a standard for state agencies and players that is at the very least equivalent to those for private sector players. The second measure involves a more streamlined and expedited legal process for lawsuits involving the state to enhance government accountability and reduce delays. Regulations should also be promulgated publicly disclosing the monetary receipts that government and related agencies derive from

projects at least annually. To what ends the government has applied these funds to should be explicitly disclosed to the public in a detailed as opposed to aggregated format.

Sustainability activists would be well advised to focus significant portions of their energy on the shareholders of the project sponsors, particularly where these originate in democratic, developed markets, and where the holding company has a high public profile. Shareholder pressure is one of the most effective levers in ensuring a project company's compliance with sustainability provisions. While equity participation in the Gautrain, PBMR, Mozal, SNGP, and Chisumbanje is at national and in the case of the Gautrain also provincial government level, equity participation at local community level in the project locality would be advantageous. Firstly, the community would be able to organise itself to ensure it benefited directly from the project. Secondly, board representation and participation in other project company forums and committees would allow the community leadership access to information and allow them input into the decision making process. Having equity participation at community level could also reduce the corrosive effect of corruption at central government level. The final consideration for sustainability activists and practitioners is to make use of anti-bribery laws in Europe and the USA that extend to European and American companies operating in other national jurisdictions. Sustainability activists could discourage rent-seeking activities through the prospect of dishonest project developers facing sanction in both the host country and their own home jurisdictions.

5.5 Conclusion

This chapter began by documenting the selected case studies across four main criteria namely, the governance arrangements, capital structure, risk management, and sustainability considerations. For the 7 cases the assertions were collated, compared and analysed for significance, relevance and applicability. Insights from the 7 case studies were also discussed for potential future application. In collating these insights into a clear and logical framework, a basis was derived for the project and infrastructure model proposed in the following chapter of this thesis. The cross case analysis is essential leading into chapters 7 and 8 that examine the applicability of the main capital structure and institutional and risk management theories to project and infrastructure finance in Sub-Saharan Africa.

6 Introducing the Normative Project and Infrastructure Finance Model

The thesis has up to this chapter, explored and examined the deployment of project and infrastructure finance in Sub-Saharan Africa focusing on 7 large-scale in South Africa, Mozambique, and Zimbabwe conducted in the past twenty years. Five of these projects were successful while two were failures (one of the unsuccessful projects was subsequently resurrected). The criteria applied to determine success or failure as stated in chapter 1 were that deviation from budget was less than 10%, the project once operating performed at 95% or more of the original engineering specifications, and construction was executed within the set time frames with an acceptable deviation of 10%. Detailed case studies were completed on each of these projects with a specific emphasis on each project's capital structure, governance, risk management, and sustainability arrangements. Observations were made on the qualitative project arrangements that supported project success or contributed to project failure.

The existing theory on project finance provides a valuable basis for understanding the framework and architecture of project finance transactions across the world. The existing theory however fails to provide an adequate lens through which to view, analyse, interrogate, and understand the specific contextual conditions impacting on project and infrastructure finance in Sub-Saharan Africa. The findings below and the conceptual model advanced propose a platform that distils the key contextual factors that influence project finance arrangements in South Africa, Mozambique and Zimbabwe. The section will summarise the key findings and propose a lens through which to more fully understand project finance transactions called the Normative Project and Infrastructure Finance (NPIF) model, captured in Figure 6-1. Project and infrastructure finance stakeholders will of necessity have to balance competing priorities with limited resources to execute the interventions proposed, and foster enhancements that advance projects and the related institutional environment at that specific point in time. As improvements are made in top priority areas identified and these are resolved, resources can be directed at second tier priorities and so on.

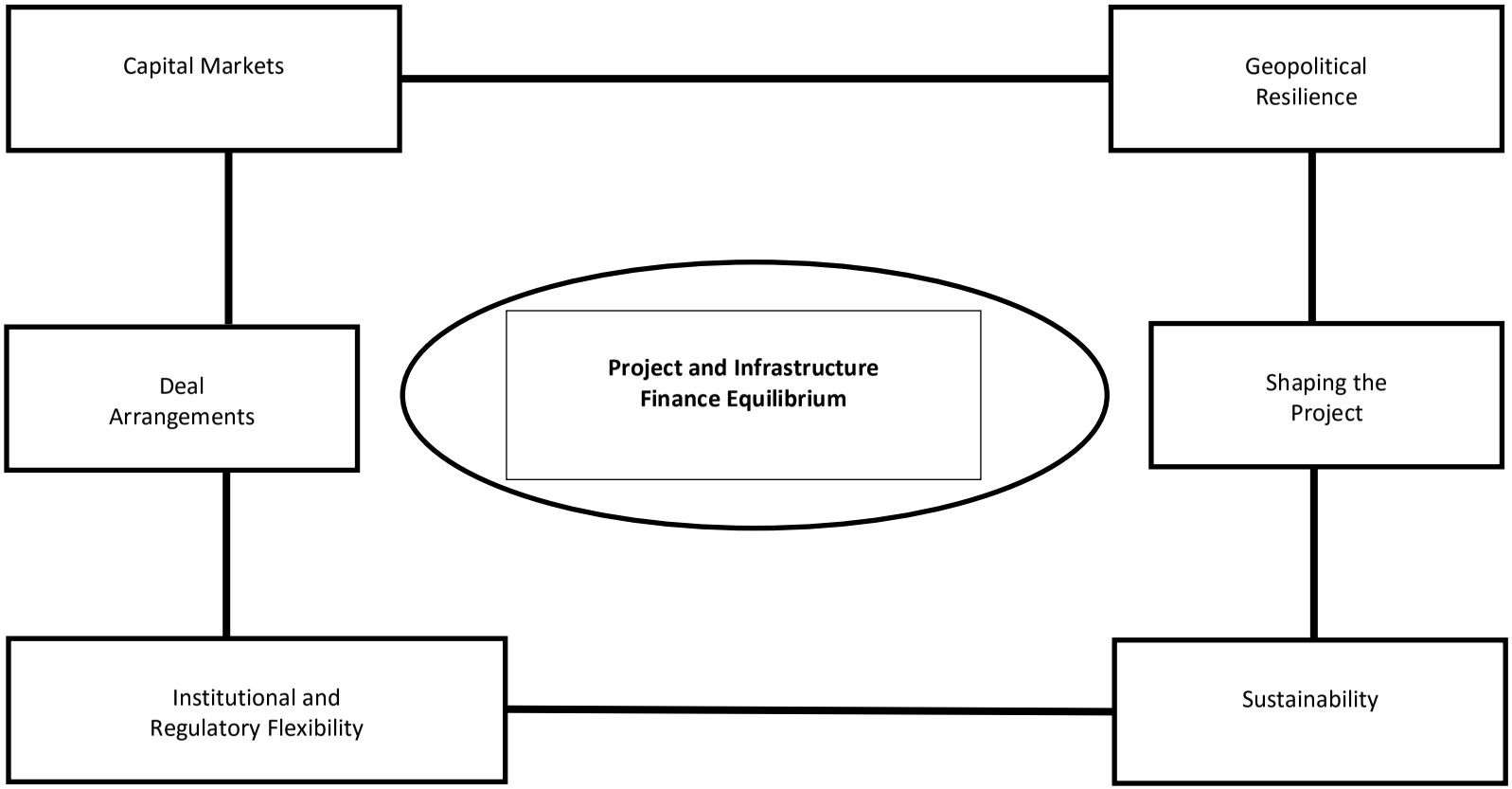


Figure 6-1: Normative Project and Infrastructure Finance Model

NPIF does not seek to convey a sequential approach. All the pillars contribute to define and inform the contextual environment and its conduciveness for project finance and infrastructure related investments. The dynamic environment in which project finance transactions occur and the broadly encompassing nature of NPIF mean that interventions will be on-going and the equilibrium will change progressively as the project finance environment advances. As such the NPIF model is not sequential in nature but envisages a series of co-ordinated initiatives across all pillars of the model that enhance the project finance environment and prospects, yet is subject to on-going improvement.

The capturing and distillation of important regional and contextual considerations allow for an analysis of the project finance theory versus actual practice in chapters 5 and 6, and why and how the application of capital structure and agency theories need to be modified when applied to South Africa, Mozambique, and Zimbabwe.

6.1 Key findings

The key findings below distil the critical insights and conclusions of the 7 case studies. These have been organised under the headings of Capital Markets, Geopolitical Resilience, Shaping the Project, Sustainability, and Institutional and Regulatory Flexibility. These findings are applicable across the three countries across which the research was conducted, and relevant to commercial and infrastructure ventures applying project finance principles. Findings that were case specific and not of universal application have not been incorporated into the conclusions and subsequent model.

6.1.1 Capital markets

A key impediment to the greater uptake of project finance and infrastructure ventures can be attributed to narrow and shallow financial markets. In the countries covered by this thesis this bottleneck is particularly observable in Zimbabwe and Mozambique. The immature development of financial and capital markets in these countries and other nations in Sub-Saharan Africa results in the mobilisation of local savings being compromised. As a result, such countries often lack a sufficiently large contractual savings industry that can aggregate savings and channel these towards large project finance and infrastructure transactions. The result of this failure to mobilise savings in a formal, regulated, and trusted financial system starves the country of a domestic source of long term finance, resulting in dependence on multi-lateral financiers and

international banking consortiums for capital. This situation is frequently compounded by the fact that the size of financial markets in African countries remains small on a global scale and relative to the size of these countries economies. As a result liquidity is often lacking deterring both domestic and foreign investors who seek assurance on the ability to be able to enter or exit a position with minimum friction.

Some of the key obstacles to the development of deep and liquid capital markets include inadequate regulatory frameworks that make for a highly concentrated banking sector, very low intermediation rates, and inefficient collateral registry systems that further impede access to credit.

The banking sector concentration results in oligopolistic and anti-competitive inclinations by incumbents. The banking sector may also fail to exercise its role of intermediation due to very high interest rate spreads that make credit expensive while deposits are poorly remunerated. This may require the reorganisation of the banking system through innovatively opening the sector to competition from both banking and non-banking entities. Deepening and broadening capital markets is likely to be a medium to long term project that has been observed in a number of key markets including Nigeria and Kenya. The efficacy of these interventions will largely be driven by the appropriateness of the policy interventions and the institutional environment that emerges as a result. These can be expected to include measures to improve the regulatory environment, purposeful interventions to build and stimulate market liquidity and improve the frequency and volumes of financial securities transacted, and possible integration of regional securities exchanges as a means of achieving critical mass.

A key insight that emerged was that even in countries with deep and liquid capital markets like South Africa, public funding is frequently critical to catalyse large project finance initiatives. Government participation as an enabler as such continues to be essential. Commercial banks participation in projects has the enhanced effect of adding rigour and robustness to the project arrangements through scrutiny of operational and financial models, and the imposition of covenants to make the project viable, and ensure debt providers recoup their capital disbursements.

6.1.2 Geopolitical resilience

The pillar requiring project finance ventures to have geo-political resilience built into their architecture is not new in Southern Africa, yet has played a significant role in how projects have been arranged, and even what

projects have been executed. During the liberation struggles in Mozambique and Zimbabwe in the 1960's and 1970's the incumbent regimes sought to ensure strategic assets were less vulnerable to sabotage, and the attendant disruption of commercial activity and life in general. Both the pre and post independence governments also sought to reduce excessive reliance on South African trade routes resulting in large investments in alternative routes such as the Beira Corridor by Zimbabwe and Mozambique, domestic ethanol production, and the establishment of local refining capacity in Rhodesia.

The nature of geo-political risk in SADC post 1994 has changed. In the first instance it has become less regional and more global in nature. The resolution of the liberation struggles in South Africa, Mozambique and Zimbabwe has reduced the regional geo-political threat, while deeper integration into the global economy has increased vulnerability to international censure. Specifically countries and projects are vulnerable to unilateral sanctions particularly from the European Union and the United States of America, and multilateral sanctions from institutions such as the United Nations. While the source of disagreements that trigger sanctions stem from political differences, the form the sanctions take is primarily economic in nature. Sanctions may include the targeting of key individuals by way of freezing international assets and bank accounts together with travel bans. Broader sanctions may include pressuring multi-nationals invested in the targeted country to divest of their operations, restrictions in the export of capital equipment and spare parts to targeted countries, and general encumbrances to inhibit their ability to export and conduct international commerce. These measures have the potential to paralyse and render inoperable a project finance or infrastructure venture.

The sanctions arsenal may also take the form of the curtailment of investment capital flowing into the targeted country by international capital providers in the private sector. This measure can be buttressed by the suspension of disbursements and capital support by multi-lateral financial institutions including the World Bank, the International Monetary Fund, and the International Finance Corporation. International transactional banking activity, including the ability to repatriate profits may also be closed off by restricting the country's ability to transfer funds via the Society of Worldwide Interbank Financial Telecommunication (SWIFT). Where export markets in Europe or North America are an integral part of the project, sanctions may take the form of prohibiting the importation of the produce of projects in targeted countries effectively compromising the market for the venture, and collapsing its financial viability.

Arbitration and mediation proceedings premised on North American and Western European legal systems are increasingly perceived as biased in favour of corporations from these regions. This is predominantly the case where disputes are between foreign shareholders and domestic stakeholders indigenous to the jurisdiction in which the project is located. Accordingly, domestic project stakeholders may seek promote the host nation's own legal system, or alternatively opt for dispute resolution to be conducted within the rules and geography of independent nations unaligned to North American and European interests.

These potential and very real restrictions applied to Zimbabwe infer that a prudent measure by Sub-Saharan countries would be to actively diversify sources of capital investment flows to other sources and regions of the world beyond North America and Western Europe, that are not as politically invested and active in the internal political dynamics within each country. Closer commercial relationships with other regions may also provide alternative routes for effecting international transactions outside of the SWIFT system should access to the latter be compromised. Projects may need to be technically configured in such a way that alternative equipment suppliers, technical advisors, and experts beyond North America and Europe can ensure on-going operations in the event of adverse geo-political developments. It is highly advisable that where exports are concerned markets are significantly diversified and the project is not singularly reliant on European and North American demand.

6.1.3 Shaping the project

Merrow (2011) describes shaping the project as 'a business-led process by which sponsors evaluate the key attributes of a potential project, develop and gather information that is needed to make key decisions, and then allocate the value of the project to the various stakeholders to make the project environment stable enough for successful execution while holding enough of the project's value for themselves to make the venture worthwhile' (p.54). While the focus of the author is on evaluating, designing and making a final decision as to whether to proceed or 'kill' the project, the shaping of the project will be considered more holistically in this thesis to include the process after a decision to proceed has been made.

A seemingly obvious aspect relating to the development and execution of a project is the need to have explicitly well formulated project goals and objectives. These act as a beacon guiding how a project unfolds, curtailing the possibility of scope creep, and giving the project executors clear

targets and aims to reach. Clear project goals and objectives also allows decision points in the roll out of a project to be identified, and on-going evaluation of the project's progress relative to the primary objectives. A failure to set explicit goals as evidenced in the PBMR has serious ramifications on the project outputs, cost, meeting of deadlines, goal congruence amongst stakeholders, and the ability of project sponsor's to ensure accountability and responsibility for decisions made. Clarifying the project goals and objectives appears an elementary exercise. It is however frequently compromised by a host of factors. These may include political pressure to commence without having determined the ultimate objective. Project goals and objectives may also be compromised by the fact that clarifying these may require a significant investment of resources, that would in effect be a sunk cost if a decision was made not to proceed with the venture. A failure to define the goals and objectives on a project and apply rigorous control measures to adhere to these is a fundamental project 'killer'.

Having made the decision to execute on a project, it is essential to ensure there is continuity in the project team. This does not mean that the team remains unchanged, but that new team members meeting the skills set required at different project stages are obtained whilst maintaining a core team and set of expertise that are present throughout a project's lifecycle from conceptualisation to operationalization, and beyond. A failure to maintain the core project team may result in a loss of institutional memory that manifests in incorrect decision-making. Careful consideration must also be made of the blend of technical and commercial skills within the project team. An imbalance of these two skills sets has the potential to compromise the project functionally or financially. In a similar vein the appropriate location of the project company in terms of reporting lines is essential. Having a project with a reporting line to principals that do not have a technical understanding of the project, or who are indifferent overseers of a venture can severely undermine project accountability and corporate governance, and also the attainment of project goals. This aspect is applicable in both a corporate setting, and perhaps even more pertinent when the project is driven or funded by the public fiscus, as the oversight function of commercial banks may be limited or not at all present.

An overlooked and neglected aspect of developing projects of an industrial scale is the communications platform with stakeholders and affected communities. The very nature and scale of these projects inevitably mean they will have an impact on a wide range and large number of people,

making them vulnerable to criticism and attack. As such, beyond the stakeholder consultation process, it is essential to establish a dedicated communications platform that is dynamic, proactive, and responsive. It must engage aggrieved parties and complainants actively using all media outlets including the growing influence of social media. This engagement and transparency not only keeps stakeholders informed, but over time can lead to a change in perceptions and neutralise unjustified hostility or misunderstanding regarding the project.

Having deep and broad political support from the governing party and structures, and across political participants is an important factor in making a project more robust and less susceptible to economic cycles. Projects with deep and broad based political support can endure the political demise of key sponsors, as there is organisational support beyond these individuals. Projects premised on a few political principals may suffer a lack of political support and credibility if these principals vacate their positions.

The thesis introduced the term of ‘the psychology of influence’ as a necessary attribute for successful project developers. The psychology of influence speaks to the credibility and need for a project development team to have access to key stakeholders and decision makers especially amongst the regulatory and political establishment. This influence does not endorse unacceptable practices such as bribery and corruption, but rather addresses the need to be able to obtain an audience with decision makers to articulate the developer’s position, logic, and activities, especially where there are disputes and facts are contested. The psychology of influence also extends to being able to persuasively engage with establishment principals expressing the virtues of the project from their point of view, and selling the project merits in terms of the benefits to the community and country concerned. This ability to access and engage key institutions and individuals extends to the project is operational phase of a venture as pro-active and on-going industry lobbying is frequently required due to dynamic sectoral and regulatory developments.

The utilisation of experienced legal, technical and financial advisers by stakeholders proved to be a key contributor to successful project execution. This measure is even more important where the project is a first of a kind for the local jurisdiction and domestic skills in the execution of such a venture are shallow. Deploying experienced advisers enables the project developer to tap into the expertise and experience of practitioners from across the world and integrate international best practice into the

entire process of project conceptualisation, commissioning, and construction.

The investment horizon of the project sponsor is key in helping to shape the project and incline it towards success or failure. Where equity sponsors have a long-term investment horizon that extends to the full life of the project, the stability of the sponsoring consortium is conducive to long-term decision making, premised on the venture's success over its entire life. This reduces the temptation of project managers to succumb to destructive short-term decisions and increases the long-term prospects of a project even when difficulties are encountered. Equity sponsors with shorter time horizons expose a project to instability in the shareholding structure, corrosive short-term decision-making, and the loss of institutional memory on the exit of the original equity participants. Where a project has significant foreign exchange exposure, immunising both the capital structure and operations from exchange rate volatility is very important. Such immunity allows the project managers to focus on operational factors within their direct control and limits the distracting effect of exchange rate volatility. In addition the process of immunisation establishes a clear and transparent business model with explicit performance goals and targets by which the project can be measured. As traditional hedging costs may be prohibitive institutional facilitation by the central bank and treasury may be required.

Where an operator is commissioned to manage and operate the project, operator incentives including billing models, subsidies, and tax incentives should be linked to the operational metrics of the project. This has the effect of incentivising the operator to meet operational performance targets set, failing which the operator's financial compensation is accordingly compromised. Risk management in the project should not be conducted extraneously, but should be embed into the project architecture from conceptualisation, and institutionalised in the project management by way of a dedicated risk management function.

The final aspects influencing the shaping of a project include the fact that in Sub-Saharan Africa the commercial opportunity may be transient in nature as a result of rapid technological and commercial factors such as in the Seacom project. Developers therefore need to be able to arrange the project architecture to facilitate agility to monetise temporary opportunities that may erode over time. Where big-ticket acquisitions are being commissioned, developers would be well advised to maintain a competitive bid process as far as possible into the procurement stages. While this may increase bid costs initially, and these may need to be

subsidised, the competitive tension can enhance the planning on the project construction and execution, and result in significant cost savings on account of a more competitive bidding process. The final consideration in the shaping of a project relates to the advantages that can be derived from embedding scalability into the initial green fields venture. The cost of integrating a scalable model frequently has marginal financial or technical implications on a project, yet embeds significant advantages if the project is successful and brownfields extensions occur.

6.1.4 Sustainability

While corporate social responsibility and sustainability issues manifest primarily as community and environmental matters globally, the contextual environment requires different and country specific interventions. Developed markets in Western Europe and North America generally have a greater range of instruments to instil responsible behaviour by project developers. These include legislation and regulations, an array of environmental and oversight bodies, greater awareness of sustainability matters by the broader population, the reputation risk faced by a company in the event of irresponsible actions, more active civil society organisations, well capacitated institutions such as local governments, and a better understanding of individual and group rights in the broader population. This context provides a platform by which there is greater accountability on sustainability issues on projects executed in these regions.

The well-developed and multi-layered checks and societal safeguards detailed above may be absent or embryonic in developing markets in Sub-Saharan Africa. As a result normative rules that are voluntary such as the Equator Principles may be effective in developed markets, yet ineffective in countries such as Mozambique or Zimbabwe. Project owners may also apply the normative rules and standards to varying degrees with greater compliance in countries with high levels of oversight, and less compliance where oversight is poor. This regulatory arbitrage in sustainability matters can in part be addressed by compliance with key normative standards such as the EP's mandatory in Sub-Saharan Africa. This action will contribute to a uniform application of international sustainability norms and standards in less developed countries in Sub-Saharan Africa. The self-regulatory nature characterising normative rules such as the EP's is unsuitable in most countries in Sub-Saharan Africa. Normative rules need to be monitored and enforced by way of independent audits. Explicit provisions also need to be made for more vulnerable rural communities and people subject to communal ownership structures, that are

susceptible to an unsurping of key human rights by both project owners and their own government's.

From a regional or continental perspective, supra-national regulations may be an effective tool to enforce uniformity in CSR standards. Such tools can be channelled through SADC and the AU. The success of such measures is demonstrated by the European Commission's mandate and actions in developing a comprehensive anti-corruption policy and the European Union Anti Corruption Act. The policy has culminated in the passage of legislation in EU countries that imposes criminal and commercial sanctions on EU companies and individuals failing to comply both within the EU and also in their activities beyond such as the Bribery Act in the UK, and the German Anti-bribery and Corruption Act.

Demand side initiatives enforcing the application of laws and standards can be blended with supply side interventions. These include systematic and on-going programmes to train and educate key stakeholders such as legislators, regulators and environmental agencies on CSR, and the ramifications it can have on national development. Collaboration with environmental organisations is an effective manner by which the authorities may be able to supplement their regulatory and enforcement function. From a project owner perspective, collaborating with environmental agencies may also be used a self interested measure to gain objective input of the environmental performance of the venture from external parties that may be more forthcoming and brutal than employees.

The importance of including community equity ownership as opposed to government ownership or ownership by equity participants not resident in the community in which the project takes place is an important proposition of the NPIF model. Community ownership allows for the financial and related benefits of the project to be enjoyed more directly by the population most affected by the venture. Local ownership also enhances grassroots participation in projects and empowers communities to hold project management teams accountable for promises made or environmental and social breaches. The insertion of community ownership as a key aspect of the sustainability provisions contrasts markedly from most current arrangements where participation by the host jurisdiction generally occurs at national, and occasionally provincial levels.

Because many project finance ventures are executed through special purpose vehicles, the equity sponsors and their respective holding companies are effectively shielded from financial liability in the event of severe sustainability miscarriages warranting financial censure, and that

the project company is unable to make fulfil. Legal amendments into the limited liability provisions of juristic persons may need to be effected that enable recourse to the holding company for compensation where there are serious sustainability breaches and the project company is unable to settle the full financial amount. Furthermore, where the project company enjoys incentives including billing models, subsidies, and tax inducements, these should be linked to the sustainability goals and metrics of the project. This has the effect of incentivising the operator to comply with sustainability provisions or incur financial loss.

Due to the fact that government agencies and principals are frequently party to the molestation of rural and vulnerable communities together with project developers, countries may need to design mechanisms that place a greater degree of legal responsibility on the state to protect rural communities and environments. Communities should be entitled to claim compensation from the government if there is a dereliction of these duties, and beyond fines, jail terms should be imposed as a court perogatives to act as a deterrent for errant civil servants. Projects developers can also monitor and evaluate community and environmental matters by integrating into each project conduits through which community and environmental issues can be raised and escalated by all stakeholders. Constructing projects parallel to existing infrastructure and consulting communities on alternative pathways or locations where feasible can also reduce the social and environmental footprint of projects.

This pillar concludes with an observation made in the conduct of the research. A respondent noted how the true motivations for a project developer or company to comply with CSR requirements are frequently difficult to determine and pin down. A leading factor compelling project companies to fulfil CSR obligations is the degree of shareholder insistence that this aspect is addressed. If shareholders did not prioritise this aspect, project owners would apply themselves far less diligently to their CSR obligations. Regulators may be well advised to devise strategies that target sources of influence or leverage within project developers that influence them to legitimately fulfil their CSR obligations that may not be obviously apparent.

6.1.5 Institutional and regulatory flexibility

Large project and infrastructure projects in Sub-Saharan Africa are frequently greenfield ventures that have never before been executed in a country. Consequently institutions within that country have limited or no experience in facilitating the project, and the rules surrounding the venture

have not been designed in a manner that fully addresses all the related regulatory requirements. It is often an essential requirement that public institutions including government departments, central banks, legislative bodies and regulators co-ordinate and co-operate in their roles in order to 'facilitate' a large transformational project. Such facilitation should occur within the confines of the law, and without it a potential project may be rendered unviable on by a range of bottlenecks.

Facilitating interventions may take a number of forms. These include government appetite to take on foreign exchange risk on public projects where the cost of procuring exchange rate hedging instruments had the potential to make a project unviable. The government can also underwrite patronage levels or usage of public infrastructure. These interventions were essential to the successful commissioning of the Gautrain Rapid Rail Link.

As the laws and regulations will usually be found wanting, public officials and institutions need to be able to expeditiously put in place enabling laws and regulations, or intermediate measures such as the Gas Agreement in the Sasol Natural Gas Project, that provide regulatory certainty for a project to commence. A continual beefing up of regulatory capacity and capability needs to be purposefully pursued, and policy makers need to work with private sector institutions to intentionally enable skills transfer and institutional building into the host economy so that a growing proportion of the expertise including advisers, lawyers, technical experts and banks can be sourced domestically. In summary, public officials must be responsive to the legal, commercial, and operational considerations that can compromise a project, but can be resolved with an appropriate, balanced, and legal application of governing authority.

Where the state is directly involved in the procurement process either by way of selecting successful bidders or directly engaged as equity sponsor and project developer transparent, predictable and structured procurement processes are essential. Such processes embed integrity and economic efficiency into a project and have the virtuous effect of attracting more international players improving the competition amongst bidders or suppliers.

Regarding the legal architecture it is proposed that each country puts in place an overarching policy framework and contact point for defined project finance and infrastructure ventures. The objective of this 'one stop shop' is to have a single point of contact where all regulations, licenses, clearances and other mandatory requirements to effect a project can be

obtained. This arrangement should reduce the bureaucratic burden of having to approach multiple government departments for the same project, encourage communication and co-ordination between public institutions themselves, and by reducing the level of friction to start projects, increase the speed and execution of ventures. The legal framework should be coupled with a process of nurturing capable, credible, and independent state players including regulators, oversight bodies and related institutions.

In addition to the regular update of key laws and regulations affecting project and infrastructure finance to ensure a progressive legal architecture, a harmonisation of laws regionally should also be implemented. Such a harmonisation in the SADC region would create a large and more attractive project finance and infrastructure market for potential investors. Harmonising laws would also encourage and enable the commissioning of more cross border and regional projects, and reduce the legal costs and uncertainty that arise due to a lack of reciprocal recognition of legal arrangements between countries in the same region, with fundamentally very similar legal foundations and practices. Harmonising laws may also reduce CSR regulatory arbitrage with project developers moving projects to jurisdictions with lower CSR requirements. To implement these regional interventions, the greater participation of the secretariats in SADC, the EAC, ECOWAS and the AU will be e key requirement.

6.1.6 Deal arrangements

The deal arrangements and terms surrounding project finance and infrastructure ventures have largely been adopted from developed markets. While most of the inherited features are prudent and wise, a number of enhancements to address contextual conditions in Sub-Saharan Africa are proposed.

The first proposition that is fundamental to all projects is the formulation of a clear, stable, predictable, and reliable funding model. The absence of a clear funding model will result in a project failing to reach financial closure. Alternatively, where a funding model is compromised after plant construction, the venture will encounter serious financial and operational difficulties that will qualify its going concern status.

NPIF also proposes an exit mechanism for certain private sector investors after they have fulfilled their construction or related role, and a period of time has elapsed to ensure that the project operations were stable. Such a mechanism would address two points. The first would be to allow

companies who partake in the construction of projects to exit once the projects reach a stable state and not be locked into an operational plant that is not their core business. Secondly by allowing specific non-core equity participants to exit projects under prescribed conditions, this can catalyse the appeal of participating in projects of this nature by EPC contractors. Having a liquidity event on minority stakes could further catalyse the development of capital markets that facilitate the trade in the equity and debt stakes related to these ventures, and increase their liquidity and the price transparency of the underlying financial instruments.

As public infrastructure programmes often require an explicit or implicit government guarantee in different forms, it is important that the public investment also generates a return commensurate with the risk that the fiscus is taking. Accordingly, it is proposed that in the event that public funds or guarantees are issued to private operators, the deal terms should articulate and define the IRR the operator is entitled to earn. Beyond this return, the national fiscus should participate in super profits in compensation for guaranteeing and underwriting the project with public funds. This mechanism is more equitable in enshrining an agreed upon IRR for private sector investors, but allowing for a more equitable distribution of monetary benefits across the private and public sectors if the project surpasses initial performance forecasts. A corollary measure is also to put in place mechanisms for the public sector sponsor to also participate in indirect economic and commercial benefits that accrue such as increased property prices and higher footfall in retail shopping malls as a result of infrastructure projects such as the Gautrain. The latter arrangement allows the fiscus to also enjoy the indirect economic benefits that accrue to projects that have been underwritten by the state.

Back leveraged structures that effectively increase the debt to equity ratio of a venture need to be managed carefully. Excessive back leverage may result in equity participants demanding more immediate dividend distributions in order to service debt obligations. This situation may prioritise short-term cash flow requirements over the medium to long-term strategic objectives of the project. To encourage a larger number of project bidders, procurement programmes should be arranged in such a way that bid costs are back loaded, and where possible only incurred by winning bidders. From a financial perspective projects may enjoy significant financial benefits if they are arranged in two parts. The first part would obtain financing for the construction of the project and the project reaching certain performance milestones. Due to the risks in this first part funding is generally more expensive. To stimulate funder’s appetite in this risky

phase project developers may adopt more conservative leverage. After the first phase had been completed, a second funding package could effectively refinance the project at on more competitive terms on account of its lower risk profile. Leverage levels could also be increased as operations will have reached a steady state and the venture will be cash generative. This systematic ring fencing of construction risk would also have the positive effect of attracting a broader range of investors particularly when the venture is operational.

The final proposal on deal arrangements is applicable when the procurement for infrastructure is being done on a fleet basis e.g. the Renewable Energy Independent Power Producer Programme (REIPPP) in South Africa. Fleet programmes can be made more economical by the regulator standardising key documents including legal agreements thereby reducing the need for each project developer to incur these costs individually, and also allowing a clearer comparison of the submitted bids.

Table 4.1 expounds on the assertions of NPIF by capturing the key requirements that inform the model and make it durable. These actions are implementable by project developers and sponsors, commercial banks, regional and international DFIs, multi-national institutions, project subcontractors, environmental activists, regulatory bodies, and other stakeholders.

6.2 Conclusion

The NPIF model proposed above submits a lens through which project and infrastructure ventures executed in Sub-Saharan Africa can be viewed more holistically. The model builds on the observations of the case studies that highlight that the contextual environment differs markedly from many part of the world including higher degrees of uncertainty, elevated levels of complexity, greater inequality and poverty, and a higher imperative for business inclusiveness. These observations are important to consider in anticipation of assessing the applicability of existing academic theories on project and infrastructure finance in this region, and how the exiting theory may be extended. The following two chapters build on the cases analysed in chapter 3, and the summary conclusions of the NPIF model proposed, to examine the applicability of the existing theories on project finance, through the prism of each case studies capital structure, and other arrangements including, institutional, legal, and contractual provisions, risk management, and sustainability considerations.

Table 6.1: Normative Project and Infrastructure Finance Model Key Requirements

	Geopolitical Resilience	Shaping the Project	Sustainability	Institutional and Regulatory Flexibility	Deal Arrangements	Capital Markets
1.	Diverse regional sources of funding	Continuity of project team. The project team should be supported by a compact sponsoring consortium	Mandatory compliance with normative standards	Bold facilitation interventions by public sector principals	Predetermined exit mechanisms for selected investors	Deep and broad capital markets
2.	Technical and engineering solutions including equipment and spare parts not exclusive to one regional group	Communications: dynamic, proactive and responsive	Independent audits of CSR obligations. In evaluating compliance, consider the imbalance in power relations between project companies and local communities	Implementation of enabling laws, regulations, or intermediate measures	Profit participation by public guarantor beyond predetermined IRR	Mobilise domestic savings
3.	Alternative settlement systems outside SWIFT and traditional global payment channels	Deep and broad political support and access to decision makers by project developers	Compliance enforcement by focusing on shareholders for multi-nationals	Regional harmonisation of project and infrastructure investment laws and regulations	Restrict back leverage structures to mitigate against compromising long term strategy to meet debt obligations	Functioning and liquid debt and capital markets
4.	Utilise host country legal system as primary contractual adjudication jurisdiction. Alternatively pre-select neutral sovereign for	Explicit and clear project goals and objectives including strong project documentation and decisive project co-ordination	Standardised regional CSR requirements	Greater prominence of supra-national structures	Mechanisms for public sponsor participation in indirect economic benefits and commercial multiplier	Effective regulatory frameworks (security/integrity) relating to financial services sector

	Geopolitical Resilience	Shaping the Project	Sustainability	Institutional and Regulatory Flexibility	Deal Arrangements	Capital Markets
	resolution of legal and related contractual matters					
5.	Alternate market options beyond North America and Europe if project is export oriented	Implement a competitive bid process	Co-operate with environmental organisations to enhance internal and external oversight	Seamless and overarching policy with single contact point for project developers pursuing project and infrastructure finance initiatives	Back load bid costs	Regulatory intervention to stop oligopolistic/anti-competitive behaviour due to excessive bank concentration
6.		Optimal project company location and reporting lines	Specific protection for rural communities and communal resource ownership arrangements	Transparent and structured procurement processes	Ring fence construction risk	Public resources (funding or other) frequently critical to catalyse large project finance initiatives
7.		Build in scalability	Supply side training and education for legislators and regulators	Develop of capable, credible and independent state players including regulators, oversight bodies and related institutions	Take out pre-construction risk leverage to allow project greater prospects of achieving financial closure. Leverage can be increased post construction	Participation of commercial banks enhances project rigour and robustness
8.		Make extensive use of international legal, financial, and technical particularly where project is first of a kind in the country	Prescribe local equity ownership as a significant part of shareholding structure as opposed to exclusively national		Standardisation of documentation on fleet build programs	Shield capital structure from foreign exchange movements

	Geopolitical Resilience	Shaping the Project	Sustainability	Institutional and Regulatory Flexibility	Deal Arrangements	Capital Markets
			government equity participation			
9.		Long term sponsor commitment to the project ideally for the full life of the project	Legal recourse to holding company balance sheets for compensation if there are serious sustainability breaches and SPV is financially unable to make good on these		Essential that there is a clear, stable, predictable and reliable funding model	Integrated and seamless insurance coverage from project construction to operations.
10.		Operator incentives such as tax concessions linked directly to operational metrics	Construct projects parallel to existing infrastructure		Develop infrastructure programs on a fleet basis to enjoy greater economies of scale	
11.		Embed risk management into the project architecture	Legal recourse to state if there is failure to protect rural communities and environments, with compensation by the government if there is a dereliction of duty			
12.		Ensure optimal mix of project team including balance between technical and commercial expertise	Link operator incentives such as tax concessions to sustainability metrics			

	Geopolitical Resilience	Shaping the Project	Sustainability	Institutional and Regulatory Flexibility	Deal Arrangements	Capital Markets
13			Build into the project architecture dedicated conduits through which community and environmental issues can be raised and escalated by all stakeholders			

7 Capital Structure Determinants

Important components of the research questions posed in this thesis include an enquiry as to how capital structure is arrived at in project and infrastructure ventures in the selected countries. This includes a consideration of the applicability of the main capital structure theories, including the static trade-off and pecking order theories, and an examination of reasons for consistency or deviation with these theories. In addition the thesis seeks to consider the applicability of the limited academic research on capital structure in project finance initiatives to South Africa, Mozambique, and Zimbabwe. The analysis of the applicability of the existing theory and observations made, are to be contrasted and compared with the actual decisions and reasons offered by project sponsors and managers in arriving at the capital structure choices of their respective ventures. This facilitates a comparison between theory and practice, and the formulation of an extended theory based on specific project, regional, and contextual considerations. Finally, the impact of agency considerations between sponsors/managers, and capital providers is the final lens through which the formulation of capital structure is to be examined in the research questions posed.

This chapter commences with a restatement of the assumptions underlying the mainstream capital structure theories, and a consideration of the appropriateness of these assumptions in the context of business, economic, and related conditions in South Africa, Mozambique and Zimbabwe, together with the 7 case studies compiled. It begins by interrogating the assumptions underlying Miller and Modigliani's (1958) proposition that capital structure is irrelevant and the value of a firm is determined by profits and the risks of the underlying assets, the assumptions of the static trade-off theory that the capital structure of a firm is determined by the trade-off of the benefits and cost of debt, and the assumptions in the pecking order theory proposing that monitoring and bond costs are minimised by using internally generated profits, then debt, and finally equity issuances. The objective of this exercise is to assess the extent to which these assumptions confirm or challenge the applicability and viability of these theories to capital structure formulation in project and infrastructure finance in Sub-Saharan Africa. The next section of the chapter compiles and rates the top 5 considerations of practitioners in the formulation of capital structure for each case. This enables an assessment of the key drivers of capital structure in each project, and posits qualitative considerations as to alternate factors impacting on capital structure in the selected countries. It also enables an interrogation to the degree of

relevance of the mainstream theories above in explaining capital structure, and the reasons for deviations between theory and practice in capital structure formulation. This evaluation is followed by a consideration of actual debt to equity ratios in the 7 case studies, and contrasted with what is generally expected in the academic literature on project finance ventures of this nature. The final part of the analysis involves a consideration of agency factors in the formulation of capital structure. These take into account dynamics between sponsors and debt capital providers, and within sponsor consortium arrangements.

The conclusion to the chapter restates the degree of relevance of the main capital structure theories, including the limited academic literature in project finance, in understanding capital structure determinants in Sub-Saharan Africa. Finally proposals on attracting greater domestic and international capital providers to project and infrastructure ventures in Southern Africa are offered.

7.1 Source and blend of funding

7.1.1 The applicability of assumptions informing capital structure theories to project finance

Miller and Modigliani assumptions

Miller and Modigliani (1958) made 6 key assumptions in arriving at their proposition that the value of a firm is determined by profits and risks of underlying assets, and capital structure is irrelevant. These assumptions were the existence of perfect capital markets, no taxes, no transaction costs, identical borrowing costs for companies and investors, symmetry of market information, and the absence of bankruptcy costs. The first assumption of perfect capital markets is a significant distortion in the selected case studies and jurisdictions, over the 25 years during which these projects were executed. In South Africa this period included the pre-1994 prescribed assets regime where banks and asset managers were compelled to invest a proportion of their assets in government bonds and related instruments. International economic and related sanctions also had the effect of disrupting the workings of capital markets within South Africa until 1994. This was exacerbated by the existence of exchange controls that restricted the movement of capital into and out of the country, and while greatly reduced still remain. Until 1996, South Africa maintained a fixed exchange rate against major international currencies as one of the tools regulating international capital flows (Eun et al., 2012). These factors indicate the assumption of perfect capital markets in South Africa over the

past 25 years to be largely erroneous. South Africa does however display relatively deep, liquid, well regulated, and an internationally regarded capital markets architecture. This includes the Johannesburg Stock Exchange, the Bond Exchange of South Africa, and the banking, pension fund, and asset management sectors. The situations in Mozambique and Zimbabwe are significantly further behind South Africa in achieving perfect capital markets. In addition to the limited development of the banking, asset management, pension fund, stock exchanges and other capital aggregators, these countries have onerous capital and current account controls, exchange controls, prescribed assets, and been variously challenged in tapping into international capital markets over the 25 year research period. Domestic capital markets are characterised by practitioners as shallow and illiquid. The assumption of perfect capital markets in these three countries is wholly incorrect and significantly undermines the robustness of Miller and Modigliani's (1958) theoretical proposition across all 7 cases and the three countries in which they are executed.

The assumption that there are no taxes does not seem to undermine the propositions of the model. This supposition appears to be one of convenience that strips out varied tax obligations across different jurisdictions and sectors. Interestingly, of the 7 cases collated taxation implications appear to be marginal. In the Seacom case 90% of the cable was located in international waters, allowing tax obligations to be significantly circumvented legally. The Gautrain is not profitable and performs a public service (GMA Annual Report, 2014). As a result it has no corporate income tax obligations. The PBMR was also never profitable, and any taxes that could have occurred if it had been successful, would have largely flowed back to the fiscus making it tax neutral. The Mozal project also received significant tax concessions, rendering tax considerations in the capital structure formulation largely redundant. The assumption of no taxes has medium applicability to Kalkbult, SNGP, and Chisumbanje, which are governed by the standard company tax obligations in South Africa, Mozambique, and Zimbabwe. The assumption of no taxes appears reasonable in application to project finance and the case studies in the thesis, giving qualified support to Miller and Modigliani's (1958) theoretical proposition. The importance of this assumption however seems to be marginal. Similarly the assumption of identical borrowing costs for companies and investors is highly applicable to all the cases except PBMR where no debt funding was obtained. The assumption is largely a matter of convenience and simplification, and enables an efficient examination of the main theoretical proposition.

The assumption that there are no transaction costs is a very important consideration. The sponsors of Seacom opted to use indefeasible rights of usage in part to alleviate capital raising transaction costs. Similarly the Gautrain, Kalkbult, Mozal, and SNGP made use of multiple credit enhancing mechanisms including equity and debt guarantees, political risk guarantees, bonds etc. resulting in transaction costs being significant factors. These costs not only affected the capital structure and overall project costs, but frequently transaction costs were incurred to enable capital to be raised in accordance with the prescribed terms of capital providers. The no transaction cost assumption is lent qualified support by the PBMR as capital was largely sourced from the South African treasury and related DFI's. While transaction costs may have been small as a result, the opportunity costs are likely to have been significant. In the case of Chisumbanje, transaction costs on capital raising would have been substantially reduced by the fact that the bulk of the capital injected into the project was in the form of arable land, and not monetary in nature. The lease from ARDA does not appear to have transaction fees related to it. Assuming no transaction costs significantly undermines the robustness Miller and Modigliani's (1958) theoretical proposition for at least 5 of the 7 cases, and its applicability to capital structure formulation in project finance.

The assumption of symmetry of market information is largely erroneous. Significant information asymmetries between project sponsors and debt capital providers are present in all the projects. Particularly in Seacom, Gautrain, Kalkbult, Mozal and SNGP this resulted in the extensive use of technical advisers and experts, as part of the due diligence processes prior to financial closure of the debt packages. Information symmetry may have been more relevant in Kalkbult due to the transparency prescribed by the REIPPP process. The nature of project finance including the use of special purpose vehicles, the highly technical nature of many projects, and the general autonomy of the management team from banks providing debt capital, increases the likelihood of information asymmetries. This significant assumption made largely in the context of listed public companies is wholly inappropriate in a project financing arrangement. The final assumption in Miller and Modigliani's (1958) theory pertains to the absence of bankruptcy costs. This final assumption is unrealistic for the purpose of exploring capital structure in project finance. Specifically, all 7 cases face a real risk of bankruptcy on account of their standalone incorporation, with limited recourse to the sponsors. This is a primary consideration by debt providers. The bankruptcy risk is made more acute in project finance due to the fact that the secondary value of the liquidated

projects under a bankruptcy scenario, is a fraction of the invested amounts, exposing capital providers to significant losses.

In summary the assumptions underlying Miller and Modigliani's (1958) proposition are all of low to medium applicability, with the exception of identical borrowing costs for companies and investors, which is high. Preliminarily, this makes the explanatory and predictive power of the proposition that capital structure is irrelevant questionable to the 7 projects under examination. It also potentially indicates the limitations in applying this theory to how capital structure is formulated in project and infrastructure finance in South Africa, Mozambique and Zimbabwe.

Static trade-off assumptions

The static trade-off theory is characterised by the key assumptions that capital structure is determined by the trade-off between the benefits and costs of debt. Benefits accrue in the form of a tax shield and a reduction of manager discretion. Costs of debt are incurred in the form of bankruptcy risks and agency conflicts between shareholders and debt providers. As a result debt acts as a disciplinary tool mediating between shareholders, management, and debt capital providers. The applicability of the assumption that capital structure is determined by a trade-off between the benefits and cost of debt was low in the Seacom, Gautrain, PBMR, Mozal and Chisumbanje cases. The Seacom, Gautrain, PBMR, Mozal, and Chisumbanje cases made conservative use of debt. This was not driven by a cost benefit analysis of the debt implications, but other factors more germane to the individual projects that are addressed in the sponsor and management considerations in arriving at capital structure below. The Kalkbult and SNGP were moderately influenced by considerations of the benefits and costs of debt in their capital structure, and this assumption has qualified support in these cases. The applicability of the assumption regarding the benefits of the tax shield on debt echoes the first assumption. Specifically, the Seacom transaction was largely immunised from corporate tax obligations due to the cable predominantly residing in international waters, the Gautrain and PBMR were not profitable with no short to medium term tax obligations envisaged, and Mozal enjoyed corporate tax exemptions except for a 1% levy on turnover. The tax shield benefit on interest expense therefore only significantly accrued to Kalkbult and SNGP.

The assumption that debt is beneficial in that it curtails management discretion has limited applicability in the 7 cases. Firstly for all the 7 cases the overall project objectives were laid out, and by establishing SPVs for a

defined purpose, management discretion was structurally significantly curtailed. For Seacom, Kalkbult, Mozal, SNGP, and Chisumbanje, the sponsors were active members of the executive and management teams, reducing the disparities between the interests of shareholders and managers. The reduction of management discretion may have been moderately applicable to entities participating in the Bombela Consortium on the Gautrain, to whom funding was advanced directly. In the same manner, the higher debt levels in the Kalkbult project has the effect of reducing managerial discretion. The fact that the main sponsor Scatec is integrally involved in the management of the project, makes the restraining nature of debt a secondary and not primary curtailment mechanism.

The assumption pertaining to the costs of debt associated with the legal and administrative risks of bankruptcy is important for companies without public funding. Specifically this assumption is highly applicable to Seacom, Kalkbult, Mozal, and the SNGP. It has low applicability to the Gautrain and the PBMR as these projects have a public mandate. Financial, business, and economic considerations that would render a private sector project, would not necessarily result in the termination of projects with a public mandate, as they are likely to enjoy financial and related support from the state. The PBMR received state funding until 2009 despite serious financial and technical setbacks, with support being terminated when the costs of constructing the prototype and further investment became exorbitant. As mentioned earlier, the Gautrain enjoys on-going subsidies through the patronage agreement, is not expected to generate profits, and it is highly improbable that the venture would be allowed to go bankrupt by the national and provincial governments. The assumption of bankruptcy has medium applicability to the Chisumbanje project. This is on account of the fact that the bulk of project capital is related to land. The value and utility of this land would not be compromised in the event that the ethanol processing plant failed. Bankruptcy risk on a value basis is thus significantly reduced.

The assumption relating to agency conflicts between shareholders and debt providers has high applicability in the case of Seacom, Kalkbult, Mozal, and SNGP. These projects are characterised by significant levels of gearing. This assumption would have medium application in the Gautrain and Chisumbanje on account of relatively low gearing. It would be entirely irrelevant for the PBMR as no debt was incurred. The final key assumption in the static trade-off model considers debt as a disciplinary tool. In the case of Seacom, the Gautrain, PBMR, and Chisumbanje this has a low level of applicability on account of conservative or non-existent

debt levels. Debt does act as a medium disciplinary tool in the case of Kalkbult, Mozal, and SNGP. As highlighted earlier in the discussion on reduction of manager's discretion, other interventions are used primarily, and debt is a secondary measure. In summary, the assumptions of the static trade-off theory are predominantly low to medium in applicability, with the exception of some high applicability areas relating to bankruptcy and agency conflicts between shareholders and debt providers. Preliminarily, this makes the explanatory and predictive power of the proposition that capital structure is determined by a trade-off between the benefits and costs of debt questionable for the 7 projects under examination. It also potentially indicates the limitations in applying the static trade-off theory to how capital structure is formulated in project and infrastructure finance in South Africa, Mozambique and Zimbabwe.

Pecking order assumptions

The pecking order theory is characterised by the key assumptions that to minimise monitoring and bonding costs, firms prefer to deploy retained profits, then debt, and finally fresh equity issuances. The second key assumption relates to asymmetry of information particularly between management and shareholders. The relevance of the pecking order theory to project and infrastructure finance ventures is inherently limited in its scope by the fact that projects are commenced via SPVs with no retained earnings. As a result, on project commencement, retained earnings from the SPV are generally non-existent, but may accrue over subsequent years. There is limited evidence for the utilisation of retained profits to fund projects in preference to debt and fresh equity issuances on all the 7 cases. In part this may be due to the fact that monitoring and bonding costs are generally high even with moderate application of debt, and as such do not increase proportionally with higher debt levels. The incentive to use retained earnings to limit monitoring and bond costs is therefore blunted beyond a certain level of debt. This would appear applicable for Seacom, the Gautrain, Kalkbult, Mozal, and the SNGP. Monitoring and bonding costs appear to be largely immaterial in the PBMR and Chisumbanje due to limited or non-existent debt exposure. The applicability of the assumption around asymmetry of market information is high due to the different level of technical knowledge between debt capital providers, project developers and their associated management teams. In summary, the minimising monitoring and bonding costs assumption has low applicability, whilst the information asymmetry assumption has high applicability. Table 7.1 below distils the applicability of key assumptions per each case study under the three capital structure theories considered.

Table 7.1: Applicability of Assumptions in Capital Structure Theories

Assumptions - Miller and Modigliani (1958)	Seacom	Gautrain	PBMR	Kalkbult	Mozal	SNGP	Chisumbanje
Perfect capital markets	Low	Low	Low	Low	Low	Low	Low
No taxes	Medium	Low	Low	Medium	Low	Medium	Medium
No transaction costs	Low	Low	Medium	Low	Low	Low	Medium
Identical borrowing costs for companies and investors	High	High	Low	High	High	High	High
Symmetry of market information	Low	Low	Low	Medium	Low	Low	Low
The absence of bankruptcy costs	Low	Low	Low	Low	Low	Low	Low
Assumptions - Static Trade-off Theory							
Capital structure determined by trade-off of benefits and costs of debt	Low	Low	Low	Medium	Low	Medium	Low
Benefits of debt: tax shield	Low	Low	Low	Medium	Low	Medium	Low
Benefits of debt: reduction of manager discretion	Low	Medium	Low	Medium	Low	Low	Low
Costs of debt: bankruptcy risks (legal and administrative)	High	Low	Low	High	High	High	Medium
Costs of debt: agency conflicts between shareholders and debt providers	High	Medium	Low	High	High	High	Medium
Debt as a diciplinary tool	Low	Low	Low	Medium	Medium	Medium	Low
Assumptions - Pecking Order Theory							
Minimising monitoring and bonding costs	Low	Low	Low	Low	Low	Low	Low
Assymmetry of market information	High	High	High	Medium	High	High	High

Applicability

Low	The assumption has low applicablity to the case, and undermines the robustness of the theoretical propositions.
Medium	The assumption has applicability to the case, and gives qualified support to the robustness of the theoretical propositions.
High	The assumption has high applicability to the case, and strongly supports the robustness of the theoretical propositions.

In summary, the assumptions underpinning the main capital structure theories appear to have very limited applicability to capital structure formulation in project and infrastructure finance based on the 7 case studies to which they have been applied. Preliminarily, it would be reasonable to be cautious about the capital structure predictive and explanatory capability of these theories to project finance.

7.1.2 Ranking practitioner priorities in arriving at capital structure

The earlier section evaluated the applicability of the assumptions informing the main capital structure theories. In general, the applicability of these assumptions was low when applied to project and infrastructure finance. Because of the low applicability of these assumptions, it preliminarily cautioned against reliance on the predictive and explanatory powers of these theories to project finance. This section collates the five major factors informing the capital structure formulation of each of the 7 projects based on the interviews with project practitioner, and the case studies compiled. It then ranks these five factors in order of importance, in effect constructing a ranking of the top five considerations that dictated the capital structure adopted. It explains the logic and thinking of the practitioners in arriving at these 5 factors and rankings. The section then summarises what the overarching determinants of capital structure, and the implications of this in the formulation of capital structure in project finance ventures in Sub-Saharan Africa.

Figure 7.2 below lists for each case study the 5 key determinants informing the capital structure based on the interviews of practitioners who partook in these projects. Each of the determinants is ranked from 1 to 5, with 1 being the highest consideration and 5 the least resonant of the top 5. Owing to the recurrence of common determinants across the cases, these have been colour coded to more forcefully illustrate both the actual determinants, and their prioritisation within each case, and across the cases as a whole. The colour coding clusters the determinants into the categories of access to capital, de-risking of the project to ensure bankability, the capacity of capital contributions of equity participants, host government facilitation, and other determinants.

Table 7.2: Practitioner Priorities in Formulating Capital Structure

Seacom
1. Access to capital (i.e. ability to source and raise requisite capital)
2. De-risk project. Ensure bankable risk profile to support point 1 above
3. Speed of execution in capital raising (deploy IRUs)
4. Securing confirmed off-takers
5. Capacity of capital contributions of equity participants

Gautrain
1. Access to capital (i.e. ability to source and raise requisite capital)
2. De-risk project. Ensure bankable risk profile to support point 1 above
3. Instil private sector rigor through using commercial bank funding
4. Lock in key EPC contractors
5. Curtail capital contribution of national and provincial treasuries

PBMR
1. Access to capital (i.e. ability to source and raise requisite capital)
2. Solicitation of capital contributions from local DFI's and SOEs
3. Solicitation of capital contributions from international partners
4. De-risk and reduce pressures on project in short term i.e. no debt service obligations
5. Prototype not commissioned due to uncertain outcomes and potential contingent liability on national budget

Kalkbult
1. Access to capital (i.e. ability to source and raise requisite capital)
2. REIPPP prescription debt capital be sourced from SA banks
3. PPA with Eskom and explicit sovereign guarantee
4. De-risk project. Ensure bankable risk profile to support point 1 above
5. Capacity of capital contributions of equity participants

Mozal
1. Access to capital (i.e. ability to source and raise requisite capital)
2. Political risk considerations
3. De-risk project. Ensure bankable risk profile to support point 1 above
4. Concessions by Mozambican government on tax, bank accounts currency and jurisdiction, repatriation of profits
5. Project expertise and experience of operator BHP

SNGP
1. Access to capital (i.e. ability to source and raise requisite capital)
2. Capacity of capital contributions of equity participants
3. De-risk project. Ensure bankable risk profile to support point 1 above
4. Political risk considerations
5. Facilitation of Sasol as primary sponsor

Chisumbanje
1. Access to capital (i.e. ability to source and raise requisite capital)
2. State facilitation by contribution of non-monetary capital in the form of land
3. Regulatory facilitation mandatory blending requirements, ethanol production license, EIA granted by default
4. Political facilitation: BOT vs partnership/joint venture. Relationship between Rautenbach and political principals
5. Water availability and related enabling infrastructure

Key
Access to capital
De-risk project to ensure bankability
Capacity of capital contributions of equity participants
Host government facilitation
Other

Before discussing the key determinants expressed by practitioners as to the top 5 factors influencing the capital structure of each project, it is instructive to note again the actual debt to equity ratios for each case summarised in Table 7.3. To a significant degree there is a divergence between the actual capital structures observed, relative to what would have been expected based on the predominant and prevailing capital structure theories. The reasons for the deviation from anticipated capital structure is explained to a large degree by the practitioner considerations in arriving at each project's capital structure.

Table 7.3: Capital Structure Summary

Project	Seacom	Gautrain	PBMR	Kalkbult	Mozal	SNGP	Chisumbanje
Debt: Equity	25%:75%	28%:72%	0%:100%	75%:25%	61%:39%	54%:46%	n/a

Seacom

The most significant factor influencing the capital structure in the Seacom was the question of access to capital. The executors were focused on ensuring that they were able to source and raise the requisite capital for the project. This key consideration was demonstrated by the fact that similar concepts including the envisaged Africa One cable had been aborted in large part due to a failure to reach financial closure. Appetite by equity and debt capital funders in such a venture on the African continent was uncertain. Furthermore, sources of capital from the African continent were limited on account of under-developed debt ad equity capital markets. The equity participants in the project reflect how this equity challenge was resolved. Equity funding was sourced from a combination of South African, Middle Eastern and American sources. The South African equity participants, namely Remgro, Convergence, Shanduka, and Sanlam were established and highly regarded private equity players with sizeable balance sheets. Herakles and IPS also came with significant capital backing. The principal sponsors also came with very good business reputations enabling the project to raise debt capital from South African commercial banks. As a collective the sponsors benefited from being perceived by debt capital providers as being credible, trustworthy, and having the means to execute the project on account of their deep knowledge and commercial understanding of the markets that the Seacom cable was designed to service. Access to capital was a key consideration also because the developers understanding of the project potential and

assessment of risks, is likely to have differed from capital providers particularly from outside the continent without the same level of insight and understanding. The exit of a European bank originally meant to be an equity investor is indicative of this. The project sponsors as a collective were subsequently able to interact with Nedbank and Investec, who arguably had a better appreciation of the risks and opportunities in the Seacom project relative to non-African international banks. The banks moved decisively in arranging facilities and finalising term sheets that addressed to most prominent risk of the project being unable to raise the requisite capital.

The second most important consideration in the formulation of Seacom's capital structure was the need to de-risk the project sufficiently so as to ensure the project was bankable, and supporting the first point above. Despite the use of tried and tested technology, as the first undersea cable servicing the African continent, the project was perceived to bear elevated risk levels. To de-risk the project key interventions were implemented in the capital structure. Firstly leverage was greatly diminished by raising a significant tranche of the project's capital through IRUs, reducing default risk. The IRUs also garnered simultaneous off-takers to a significant portion of the cable's capacity ameliorating the market risk. The confidence shown by large credit worthy commercial entities signing IRUs signalled the project's strong business case and credibility. The third most important consideration influencing Seacom's capital structure formulation was the need to be the first to market. This was a critical aspect of the project concept and the transient opportunity identified. To achieve speed of execution the number of equity participants was purposefully designed to be compact allowing speedier and more efficient decision-making processes. This differed substantially from the traditional consortium arrangements with a much larger shareholder base. The deployment of IRUs further supported the speedy raising of capital for the project. The speedy raising of the project capital and execution of the project build, ensured Seacom was first to market, and was able to capture and monetise the pent up demand as a result of its first mover advantage. The fourth key determinant is also related to the IRUs, in that they enabled firm off-takers to be secured even before project construction commenced. This is a recurrent characterisation in project finance. The final top 5 consideration informing Seacom's capital structure was the capacity of equity participants to make equity contributions to the venture. With a total project value of US$ 600 million funded predominantly by equity, some partners had significant constraints. This resulted in some of the back leveraged structures detailed in the actual case exploration. Capital

structure in the project has subsequently been influenced by the need to distribute retained earnings as dividends to allow these back leveraged debt obligations to be serviced.

Gautrain

The primary factor influencing the capital structure of the Gautrain was the access to capital i.e. the ability to source and raise the requisite capital. The Gautrain was the first high-speed metropolitan rail network in South Africa and Sub-Saharan Africa. As a consequence of this the project was perceived to have a high degree of uncertainty regarding execution, timelines, funding, and patronage etc. South African banks had no experience in directly funding a project of this nature, and as a result were relatively risk averse. The banks also used traditional cash flow based funding models to determine a venture's debt servicing capacity culminating in conservative leverage. The banks risk profile of the project was also elevated by the duration of the contractual agreements between the Gauteng Provincial government and the Bombela Consortium that extend over 20 years, with the debt tenors premised on this term. The long concession duration exposed the banks to higher levels of uncertainty, unexpected occurrences, and as a result, contingent liabilities. As a result of these facts, the national and provincial governments were compelled to furnish the majority of the capital for the Gautrain by injecting equity into the project, and debt capital was limited. The national government was also concerned that excessive borrowing for the Gautrain in domestic debt capital markets could have the unintended consequence of crowding out private sector borrowing. The commitment of the national and provincial governments, and the utilisation of pubic funds predominantly for the project, allowed the venture to proceed more rapidly than would have been the case if the majority of the capital were sought by way of debt.

The second factor practitioners prioritised and impacting on the Gautrain's capital structure was the necessity to de-risk the project, to enable the raising of both debt capital and public funding, but also to attract credible EPC contractors internationally. The day-to-day operational management of the project assets and the Bombela consortium were institutionalised in the GMA. The exposure of debt capital providers was mitigated by a patronage guarantee absolving them from traffic risk, and the extensive construction and operating risks were dispersed to the Bombela consortium, with financial ramifications if these were not adequately managed. Similarly, the state took on the foreign exchange risk, as insisting that it remained in the project would have compromised its financial viability. These derisking and facilitation interventions had a

significant influence on the final capital structure and risk profile of the project, enhancing its bankability and reducing its risk to attract debt capital from local banks. The third priority in the capital structure formulation is sponsors of the Gautrain purposefully sought to instil private sector rigor into the project by using commercial bank funding. This was an intentional risk mitigation intervention that not only resulted in debt capital being raised, but also supported the implementation of risk mitigation measures, enhanced the credibility of the initiative, helped the sponsors in negotiating terms with EPC contractors and related vendors. The fourth most important determinant in the capital structure formulation of the Gautrain was the need to lock in EPC contractors and align their interests with the sponsors by compelling them to contribute a portion of the project capital. The capital contributions from the EPC contractors were also useful in incentivising performance in the execution of project obligations as EPC contractors were both vendors and equity participants.

The fifth most important determinant in the Gautrains capital structure was the attempt to curtail the capital contribution of the national and provincial treasuries. Despite the overall large contributions to the project from public funds, South Africa was faced with fiscal constraints and competing priorities. As a result the sponsors wanted to limit or defer their overall contribution to the project where feasible. Whilst the debt capital sourced from the private sector constituted a small proportion of the overall capital base, it effectively reduced the capital injection by the state.

PBMR

References to a capital structure in the execution of the PBMR have the potential to cause greater confusion, as opposed to offering greater clarity. On this account, the financial arrangements relating to the PBMR will be referred to as the funding model. The most significant factor influencing the funding model in the PBMR was the question of access to capital. Importantly, the PBMR was a FOAK project that had not been successfully commercialised anywhere in the world. Due to its exploratory nature commercial debt funding was not a realistic alternative. The only option of the SA government was to fund the project primarily from the fiscus. This also had limitations due to the competing priorities of the SA government, and extensive social and development commitments. The national budget invariably had a political dimension to it, with funding for the project versus other priorities contested. The second factor was the solicitation of capital contributions from local DFIs and State Owned Entities (SOEs) including the IDC and Eskom. The latter were an important source of funding for the venture, as they were an alternative to the national budget and less

subject to political contestation. Eskom and the IDC also stood to benefit directly if the PBMR was successful. It is notable that at the time the PBMR was being vigorously executed in the mid 2000s, both Eskom and IDC were enjoying significant profits and cash flows, and had the financial capacity to fund the project. By 2008, Eskom was suffering major capital constraints due to a new build program. Similarly the IDCs balance sheet began to deteriorate at the start of the international financial crisis in 2007.

The third most important determinant to the PBMRs funding model was the solicitation of capital contributions from international partners. These contributions were to share the development costs and lock the international partners into the project strategically. In addition to providing funding it was envisaged that the international partners would assist in selling and licensing the PBMR in European and American markets if successfully commercialised. The fourth consideration in PBMRs funding model related to a bid to de-risk and reduce short-term pressures on the project by ensuring the venture had no short-term financial repayments, including debt-servicing obligations. The final consideration addresses the financial reasons as to why the PBMR was effectively terminated by the South African government. The envisaged proto-type was forecast to cost in excess of R 30 billion, with uncertainty in terms of final costs, outcomes, and the commercial potential. Due to the loss in confidence in the project, the high price tag, competing priorities, and contingent financial liabilities that could arise with its continuance, a decision was made to terminate the venture.

Kalkbult

The most important consideration in the determination of the capital structure of the Kalkbult project by practitioners was access to debt and equity capital. The Kalkbult project was awarded in the first round of the REIPPP. As the REIPPP was a new policy tool, it did not have a record of successfully executed projects in its first round iteration. Uncertainty was also fuelled by the failed Renewable feed In Tariff (REFIT) attempted by the South African authorities a decade earlier. The principal sponsor Scatec was an established European player with a significant balance sheet, and access to European capital markets. Scatec's experience in the construction and management of solar energy plants, assessment of risk, reputation, and proven track record were essential in attracting both equity partners, and debt capital providers. From an equity capital perspective, capital invested in this form is locked into the project and has limited flexibility over the 20-year concession period. The REIPPP and DOE

regulations prescribe that changes in equity are forbidden in the first three years of the concession period, and DOE approval is required even in the years thereafter. Such an arrangement makes the retraction and repatriation of equity injections difficult, encouraging lesser contributions of this nature, and a greater application of debt. The second most important and related determinant of capital structure in Kalkbult was the mandatory REIPPP prescription that all debt be sourced from South African banks. Due to South Africa's highly developed debt markets this was an attractive proposition enabling a natural currency hedge between the interest rate and the tariff, and tax deductibility of the interest expense.

The third most important consideration was the signing of the PPA (including the tariff over the concession period) with Eskom and the explicit government guarantee on the latter. This measure gave a high degree of transparency and certainty regarding project cash flows, enabling the application of higher degrees of debt funding. On the project's execution the South African government also enjoyed an investment grade credit rating, helping project developers to secure reasonable funding terms, and reducing the amount of equity capital required. The fourth most important factor in determining the capital structure of Kalkbult was a bid to derisk the project to make it bankable and attract the requisite debt capital. While this was in part achieved by the reputation and experience of Scatec, the receipt of the PPA and overall robustness of the REIPPP, a meaningful contribution of equity capital was considered a vital ingredient. The final consideration in the formulation of the Scatec capital structure related to the capacity of equity participants to contribute capital. Scatec was able to readily raise significant amounts of equity capital. However, it needed to be cognisant of the reality that other equity partners were unwilling or unable to inject high levels of equity into the project. The empowerment vehicles in the form of the community trust and women's group faced particular challenges in this regard, curtailing equity injections into the project.

Mozal

Mozal marked the emergence of Mozambique into the mainstream regional and global economy after the abandonment of Marxist policies and a resolution of the civil war. As the first large project to be executed in this new era, the first and most important factor determining the capital structure was access to capital. In order to attract sufficient debt capital, a large lending consortium of over 20 banks was established anchored by the IFC. The size of the consortium allowed for exposures to the project by each lender to be limited. In addition a significant proportion of the debt-

funding consortium was made up of multi-lateral DFIs with appetite for lending risk, but limited or no appetite for equity risk exposure. The bulk of the capital was thus sourced in the form of debt funding. The second most important consideration in determining the capital structure of Mozal was the political risk considerations associated with Mozambique. Despite political risk cover and credit risk cover being procured from MIGA and ECIC respectively, both debt and equity capital provider assigned an elevated level of political risk to Mozambique. Debt funding was therefore a more attractive proposition to the project developers than equity funding.

The third most important factor in determining the capital structure of Mozal was a bid to derisk the project to make it bankable and attract the requisite debt capital. This was achieved by ensuring that a significant portion of the capital funding the project was in the form of equity. The significant equity contribution signalled the sponsors' commitment to the project. The fourth consideration influencing the capital structure, were the concessions made by the Mozambican government. Firstly the exemption from corporate tax and the imposition of a flat 1% levy on turnover meant that any tax benefits to be derived from the deductibility of interest expense were rendered null and void. Furthermore, the terms of the project allowing bank accounts to be held offshore and the immediate repatriation of profits reduced the degree to which retained earnings contributed to the project's capital structure. These banking arrangements were to a significant degree informed by political risk mitigation concerns addressed in the second consideration. The final factor influencing the capital structure of the project was the expertise and experience of the operator BHP. BHPs experience reduced the equity-funding requirement by communicating that the levels of uncertainty regarding the technical execution and engineering of the project were low and readily mitigated.

Sasol Natural Gas Project

The most significant contributor to the capital structure arrangements in the SNGP is a consideration of access to capital. Whilst Sasol was prepared to inject significant equity capital into the project and enable credit facilitation by leveraging off its strong balance sheet, for the project to proceed significant amounts of debt capital were essential. Being based in South Africa allowed Sasol to access South African debt capital markets, and the existing deep relationship with Standard Bank was immensely beneficial. The second important consideration in determining the capital structure related to the capacity of other equity participants to make equity contributions. The government owned South African iGas and Mozambican ENH were unwilling to inject equity capital into ROMPCO

and be exposed to construction risk. As a result the funding for this largest part of the project had to be formulated in a novel way enabling iGas and ENH to inject their equity contribution only after the project was operational. This had the effect of increasing the debt component in the overall project, and particularly the ROMPCO portion. The third and related consideration was to derisk the project sufficiently to ensure it was bankable. In this respect the overall leverage of the project was made relatively conservative with a debt to equity ratio of 53.9% : 46:1%. The debt to equity ratio in the ROMPCO leg of the transaction was however markedly different beginning at 99%:1% in 2004, and closing at 66%:34% in 2012. The lower leverage in 2012 is largely attributable to the subsequent equity injection of iGas and ENH.

Political considerations were key in the formulation of the capital structure. In addition to equity risk insurance and loan guarantees being procured, the debt funding costs were fixed to 7.55% by deploying interest rate swaps. These interventions enabled a stable and coherent debt package that had clear path to retirement, and reduced the likelihood of restructuring, refinancing, or other similar interventions. The final and essential aspect informing the capital structure of the SNGP was the facilitation of Sasol as primary sponsor. The SNGP is not a pure project finance transaction as defined in the literature review. It contains the core aspects of project finance, but is buttressed by the credit enhancement and related facilitation effected by Sasol to enable the transaction to be concluded. It is therefore a hybrid transaction incorporating both project and corporate finance aspects.

Chisumbanje

The capital structure of the Chisumbanje project was primarily constrained by access to monetary capital funding from internal and external sources. Access to capital internally was limited due to the economic crisis in Zimbabwe, including hyperinflation up till the introduction of dollarisation that decimated the capital base of the banking sector. Mainstream international financial institutions including DFIs had limited appetite to fund Zimbabwean projects in general on account of both the economic deterioration that had occurred, uncertainty regarding the political outlook, and targeted sanctions against President Robert Mugabe, and individuals politically and commercially connected to him. The principal sponsor Billy Rautenbach was one of those individuals with close connections to the president, and on the EU and USA sanctions list, cutting off capital from these jurisdictions. As a result of this the state facilitated the bulk of the capital to Chisumbanje through a non-monetary equity contribution in the

form of land from ARDA. This is the second most critical factor that informed the capital structure of the project. Current accounting conventions (and concomitant capital structure calculations) have not been designed to recognise a non-monetary contribution as effected in the Chisumbanje project. The furnishing of land by the state can variously be described as irregular and un-procedural, lacking transparency, and questionable in law. As a result they fail to capture the value of the land made available to the project in the overall capital structure arrangements. Such an omission would fail to reflect a critical and the most significant input by value, without which the project could not have proceeded.

The third most important factor informing the capital structure was regulatory facilitation, again either augmented directly by the state or by way of state institutions. These included the issuance of an ethanol production license and mandatory blending requirements by the ZERA. In addition, the EMA failed to issue a verdict on the EIA in effect resulting in environmental authorisation being granted by default. The actions by regulatory and state institutions, that culminated in favourable outcomes for Green Fuel, despite these institutions themselves conceding due process in terms of their own working s had not been followed, appears to indicate political override of the regulatory processes. The decisions enabling the project to proceed enabled project sponsors to inject more levels of equity into the project operations, and to extend the land usage the venture encompassed. Limitations regarding the availability of appropriate land were in part addressed by commissioning surrounding farmers to plant sugar cane on their smallholdings and supplement own produced feedstock. The fourth decisive factor in the capital structure also arose from the political decision making process. Chisumbanje was contested on the grounds that it was executed as a BOT as opposed to a partnership/joint venture. Had the partnership/joint venture route been pursued, the capital structure is expected to have diverged significantly from the BOT arrangements. Importantly, ARDA's bestowment of land would be recognised more explicitly in the funding arrangements, and the state's other facilitative contributions would have warranted capital acknowledgment. The final consideration informing the capital structure on Chisumbanje was the need to invest in enabling infrastructure including dams, irrigation equipment etc. This requirement increased the capital and equity contributions of the principal sponsor above and beyond the funding of the ethanol production plant.

7.1.3 Managerial agency factors in capital structure formulation

Agency costs and information asymmetry are key considerations in the determination of capital structure in the static trade-off and pecking order theories, together with the project finance literature. In the collation of the top 5 factors influencing capital structure in each of the cases expressed in Table 7.2, in no case was the concern regarding managerial discretion listed as a consideration. This is not to suggest this factor was irrelevant to the project as a whole, but rather that other means may have been applied so that managerial/shareholder conflicts of interest were not primarily required to be addressed by capital structure interventions. Before considering potential shareholder/manager agency costs for each case, it is important to note that in all the cases the overall project outcomes were clearly defined. The PBMR had challenges regarding defining the technical specifications of the reactor, but the overall outcome was clear in constructing a miniaturised pebble bed modular reactor that would generate electrical power. On account of these clearly defined project outcomes, and singular goal in each venture, the scope for management discretion was inherently severely curtailed.

In the Seacom project potential shareholder/manager agency costs were addressed by ensuring the executive management team was predominantly made up of the project sponsors themselves. This included the CEO of Seacom, and other employees seconded from the project sponsors to the project company. This arrangement occurred seamlessly in large part because the employees in the sponsor companies involved in developing the project and getting it operational retained strategic managerial roles in the project company. With internal and external reporting lines to project sponsors, the prospect of agency costs due to shareholder/managerial conflicts was significantly ameliorated. In part this was viable for Seacom because the project company employs approximately 110 people in total. The practice of seconding sponsor employees to the project company to achieve this objective ha continued. As a result managerial discretion regarding strategy, dividend declarations, investment and divestment, borrowing, procurement, stakeholder engagement and interaction, without sponsor participation, knowledge, and authorisation, is negligible.

In the case of the Gautrain, the issue of shareholder/managerial discretion was addressed in three ways. As a PPP, the Bombela Consortium is responsible for managing its own staff and operations subject to specified

guidelines. These guidelines constitute the second intervention in the form of the GMA setting performance criteria and explicit operational outcomes. These operational outcomes are the basis upon which compensation to the Bombela Consortium is determined, including importantly the patronage guarantee levels. The Gauteng provincial government established a dedicated entity in the form of the GMA to conduct oversight and protect the provincial interests. Consequently the GMA monitors, reports on, and enforces the agreed upon operating metrics for the Gautrain. The GMA cannot unilaterally amend the agreed terms without approval from the provincial authorities. The third intervention alleviating shareholder/manager agency is the legal requirement that the GMA reports into and is responsible to the Gauteng provincial government. The GMA gets its budget from the provincial government, and whilst operationally autonomous, requires authorisation for non-operational decisions including for example the procurement of new carriages and trains as observed in 2015. The strategy of the project sponsors to mitigate against shareholder/manager agency costs has been to apply the PPP framework by not directly managing private sector contributors, but setting, monitoring, and enforcing operational outcomes. Management in the Bombela Consortium or the GMA cannot deviate from operational outcomes, or engage in non-operational activities including capital expansion or borrowing, without authorisation from the principal sponsor, specifically, the provincial government.

In the case of the PBMR, it would be reasonably expected that the primary sponsor in the form of the South African government, would have used the fact that the project derived the bulk of its capital from the national budget as a tool to dictate terms, and limit agency costs due to managerial discretion. In practice this was unsuccessful because the government's project goals were not explicit, changed, and were contested by Eskom and the PBMR management and engineering team. The exploratory nature of the project also meant technical and engineering considerations trumped financial considerations, weakening the power of the sponsors over the management and engineering team. Within the PBMR, the administrative managers, including the CEO lacked the technical and scientific skills required to engineer the reactor, and as a result struggled to hold accountable their own technical team, despite the fact that it reported into them. The DFIs and international partners were limited in their influence on the management team on the PBMR because the overwhelming bulk of the capital originated from the South African government, with the incumbent president having a keen interest in the project continuance. Finally, despite the PBMR company being constituted

as a subsidiary of Eskom, the Eskom management team had indirect sight over management activities, and sought to distance Eskom from the project early on in its life. Combined with the multiple reporting lines across different government departments, managerial oversight over the PBMR was erratic, weak, uncoordinated, and potentially under-resourced. The result was that the funding model and budgetary allocations were ineffective in guiding, monitoring, overseeing, enforcing, and directing managerial actions.

The Kalkbult project restricted the extent of potential manager/shareholder agency costs through three key interventions. In the first intervention primary sponsor Scatec seconded key employees and executives to both the project company and the company that managed the plant through an operating agreement. Secondly, the management fee payable to the operating company was transparent and authorised by the other equity sponsors. Thirdly, the nature of a solar photovoltaic plant is such that it is not labour intensive, and significant aspects of the plant's operations can be automated. Monitoring of key operational metrics on the plant is therefore performed via satellite by Scatec in Norway, negating the need for a sizeable and separate management team located in South Africa. Issues of managerial discretion thus played an insignificant role in the capital structure formulation of the project.

The Mozal project was effectively an owner-managed project. BHP held 47% of the equity and was the principal sponsor with the highest equity stake. In addition to this the project company had an incentive based management contract with BHP, on account of its extensive experience and expertise in developing aluminium smelters. The executive management team and other key staff members responsible for the management of Mozal's day to day operations came from BHP, particularly in the early years of the project. It is notable that an explicit decision was made that no single sponsor would have a majority stake in the project. This resolution was largely applicable only to BHP as it was the only sponsor approaching a majority stake. In addition to having the largest equity stake, the fact that BHP managed the plant is likely to have resulted in concerns by minority shareholders that BHPs position in the project company was overly dominant. As a result, minority shareholder protection considerations, coupled with the allocation of the management contract to the principal sponsor, were balanced by ensuring that BHP did not take up a majority equity stake in the project company. While not necessarily altering the capital structure, this had the effect of finalising the shareholder arrangements.

The SNGP is also characterised as essentially being an owner- managed project. Sasol owned a majority stake in all aspects of the project at commencement, with changes in equity ownership in ROMPCO post construction, and operations reaching steady state. From a managerial perspective, it is difficult to distinguish between employees of Sasol and the project entities particularly in the early years of the project's operations. This was necessitated by the fact that not only was Sasol the principal sponsor, but that amongst all sponsors Sasol alone possessed the technical expertise and intellectual property in the value creation process across different stages of the project. The substantive integration of the SNGP into Sasol's overall management significantly addressed shareholder/owner agency costs concerns. As such, shareholder/owner agency costs were an insignificant consideration in the formulation of the capital structure.

The Chisumbanje project reflects a similar pattern to most of the projects above. Sponsors remain intensely engaged in the project company including seconding and deploying their own executives to the project company, and a seamless interchange between the project sponsors and the project company executive management team. The capital structure in Chisumbanje predominantly reflects equity contributions in the form of land. The circumstances surrounding the project were not amenable to significant changes in the capital structure framework, and evidently, manager/shareholder are secondary and insignificant considerations in the project's capital structure formulation.

In summary, the importance of deploying capital structure as a measure to reduce agency costs between shareholders and management can be observed to have had low prominence in the 7 case studies. The most prominent and effective measure to reduce shareholder/manager agency costs was to deploy sponsor employees into the respective project company. These employees were involved in the development of the project and as a result had extensive expertise. In addition to contributing to the management team of the project company, their role was to also ensure the interests of the sponsors were protected, and their plans executed. This rotating arrangement between being employed by the sponsor and being employed by the project company is evidenced by the observation that key executives seconded to and employed by the project company, frequently returned back to their positions with the original sponsor employee after a duration of time had elapsed. Such methods to mitigate shareholder/manager agency costs were effective and implemented without resort to changing the project capital structure.

These arrangements were in part enabled by the fact that the limited number of project sponsors resulted in concentrated ownership levels. Concentrated ownership is more conducive to more effective managerial oversight, as opposed to diffuse ownership patterns frequently applicable to listed companies. Furthermore, the challenges in raising capital may have relegated the management of conflicts of interest between shareholders and managers to other secondary mechanisms beyond capital structure formulation.

7.1.4 The main drivers of capital structure in the case studies

Access to capital

The analysis in the above sections and distilled in Table 7.2 is useful in observing the main drivers of capital structure in the selected cases, and discussing the reasons as to why these drivers have such prominence. Without exception the main factor contributing to capital structure is access (or lack thereof) to requisite equity and debt capital. This consideration is paramount in every single case due to the observations made in the PIFE model, regarding the shallow and narrow capital markets that characterise most of Sub-Saharan Africa. Practitioners purposefully designed the envisaged capital structure to enable them to attract and secure the requisite capital. This contrasts with the position of project developers in developed markets where access to capital can be assumed as a given, if the project overcomes financial, operational, and regulatory hurdles. Uncertainty regarding access to capital also saw the extensive application of alternate funding methods including IRUs on Seacom, massive state equity funding on the Gautrain and PBMR, and non-monetary state equity injections on Chisumbanje. Observing and acknowledging the primacy of access to capital as the most significant contributor to capital structure renders the assumption of perfect capital markets contained in Modigliani and Miller's (1958) hypothesis to be wholly misplaced. Applying this assumption leads to inappropriate, incorrect and irrelevant conclusions as to the derivation of capital structure in the cases as the contextual environment in raising capital in these markets is largely divorced from the environment in which the Modigliani and Miller (1958) hypothesis was formulated.

De-risk project for bankability

The second most prevalent consideration in capital structure formulation is closely correlated to the first, and relates to de-risking projects to support

their bankability and financial closure. The prevalence of de-risking indicates that there is an elevated perception of risk in the cases investigated. While the key risks and mitigating interventions relating to each case have been identified and discussed, it appears that project and infrastructure projects in the three countries contained risk profiles warranting strategic mitigation in the capital structure to ensure the projects remained bankable. Applying conservative leverage in the capital structures of Seacom, the Gautrain, PBMR, Mozal, SNGP, and Chisumbanje was essential to reach financial closure and ensure project bankability. This conservative application of leverage increased the prospects of project execution, and if neglected could have jeopardised project implementation.

Capacity of capital contributions by equity participants

The third most prevalent factor influencing project capital structure was the capacity of different sponsors to make equity contributions. In each of the case studies the capacity of participating sponsors to make equity contributions differed markedly. Generally Mozambican, Zimbabwean, and local national sponsors in countries such as Kenya and Tanzania, including private and state players, faced severe equity constraints. International sponsors, together with South African based corporates and banks enjoyed much deeper equity resources. Accommodating these parties within a fair ownership arrangement within the project companies was a key challenge. In the Seacom case, some of the smaller equity participants resorted to using back leveraged structures, and insisting on significant equity distributions to service these. In Kalkbult, the community trust and women's group raised equity funding from the DBSA using a complex and expensive preference share structure. For the SNGP the equity contribution of iGas and EMH was deferred for a number of years in the ROMPCO leg of the transaction. And in Chisumbanje, the state resorted to a non-monetary contribution in the form of land.

Host government facilitation

In 6 of the 7 cases, host government facilitation is the fourth most prevalent contributor to capital structure formulation. Seacom is the only project where host government facilitation was not one of the top five factors impacting on capital structure. Host government facilitation was however essential in enabling landing points and other regulatory approvals. For the Gautrain and PBMR host governments influenced the capital structure and funding model by directing to the project the overwhelming bulk of the equity funding required. This occurred directly

through the national budget, and indirectly through capital injections from government controlled DFIs, effectively defining the capital structure. In addition the patronage agreement on the Gautrain, together with the sterilisation of the project's foreign exchange risk exposure ensured debt funding could be raised, and the project could proceed. State facilitation for Kalkbult was highlighted in the PPA with Eskom that was underwritten by a sovereign guarantee. In Mozal extensive concessions were made on tax, bank accounts, profit repatriation, import and export duties etc. that enabled the project to operate seamlessly, and raise significant portions of debt capital. For Chisumbanje mandatory blending and the application of state owned land had a massive influence on the projects capital structure arrangements. These cases demonstrate that project and infrastructure finance initiatives in Sub-Saharan Africa face considerably higher barriers where support and facilitation from the host government is missing. Host government facilitation was essential in the projects mentioned above, and without it, these projects would likely have failed reached to reach financial closure.

Other factors

There were a number of other important factors that influenced the capital structure of the cases that are not directly related to one another and cannot be clustered under a single banner. These included the reputation of project developers and their related expertise, and the locking in of EPC contractors by ensuring they also had equity exposure to the underlying projects when they were operational. Securing off-takers on the project outputs and political risk considerations were also top 5 considerations amongst the cluster of projects. Whilst these factors were raised as independent matters by practitioners, it is likely that they indirectly contributed to the access to capital and de-risking of project priorities, which were the top two primary factors determining capital structure.

Summary

The determinants of capital structure in the cases differs from what would be expected if applying the static trade off theory, the pecking order theory, and the limited academic literature on project finance. In particular, with the exception of Kalkbult, the remaining 6 cases reflect very conservative leverage. This can in part be explained by the following observations. Firstly, many of the cases involve pioneering projects that are being executed for the first time in the respective countries. To de-risk these projects to attract equity and debt capital, limited application of debt is effected. Secondly, the benefits of debt in the form of interest rate

deductibility and the arising tax shield appears to be of lesser importance, and therefore prominence in the capital structure calculus. This can be explained by the fact that a number of these projects do not have profitability as a core goal (Gautrain and PBMR), a number have bespoke tax arrangements (Mozal and SNGP), and Seacom had very limited tax obligations in each country on account of 90% of assets being located in international waters. Furthermore, the significant state facilitation on a number of the projects meant that cash flows from tax would simply be a circular flow of funds from state to project, then back to state. All in all, the deductibility of interest is a factor that is over emphasised where the static trade off and pecking order theories are applied to capital structure in project and infrastructure finance in the cases detailed. Thirdly, agency conflicts between shareholders/managers are readily mitigated through other interventions, with the priorities in the capital structure arrangements geared towards accessing capital and de-risking the project.

A striking observation in the cases was the very limited incidence of conflicts between shareholders and debt capital providers. In the case of Seacom robust discussions occurred between these parties when a working capital facility was being negotiated. Debt capital providers sought greater clarity in terms of the projects forecasts of future annuity income. These matters were resolved and the facility advanced, despite never being used. Ultimately all debt obligations were consolidated with one banking institution, namely Nedbank on mutually agreed terms. On Mozal, shareholders expressed reservations that the IFC took fees on non-disbursed funds as the project was completed well below budget. In the Gautrain, the sponsors communicated that in the event of a refinancing of the debt facilities, they would expect to participate in the benefits that accrue (the debt sits nominally with the members of the Bombela Consortium). The limited conflict between shareholders and debt capital providers indicates that terms and conditions of debt funding were comprehensive and fulfilled by the respective project companies. The incidences above occur largely due to changes in the existing facilities, or new facility applications.

7.1.5 Applicability of mainstream capital structure theories

Despite the critique of the static trade-off theory, pecking order theory, and project finance literature, the cases corroborate a number of propositions on capital structure formulation in the academic literature. Firstly in the static trade-off theory, Decloure (2001) highlights how different legal, economic, social and business contexts affect capital structure. The pecking order and static trade-off theories are limited in capturing these

important contextual considerations, in part because their underlying assumptions preclude a number of meaningful background matters. As a result the theories do not fully explain capital structure in the selected cases and countries. Another factor highlighted by Gwatidzo and Ojah (2009) is that capital structure in Sub-Saharan Africa is strongly influenced by reputation. This was evident in projects that leveraged off the reputation of the developers and sponsors in arriving at their capital structure including SNGP, Gautrain, Seacom, Mozal and Chisumbanje. In addition the interventions in formulating the capital structures in each of the 7 cases supported the proposition that where rudimentary capital market systems are the case, firm/sponsor specific factors act as private market remedies. The lower long term debt ratios observed in Seacom, the Gautrain, PBMR, SNGP, Mozal, and Chisumbanje support the observation by Booth et al (2001) and De Wet and Gossel (2016), that lower long term debt ratios may be attributable to potentially higher agency costs between sponsors and debt capital providers. Adding to this are the higher capital raising transaction costs exacerbated by the need for political risk and related insurance on both equity and debt tranches that disincentivise the utilisation of debt capital in particular (Titman and Wessels, 1998). The deduction by Bevan and Danbolt (2004) that leverage is correlated to tangibility appears to be highly applicable. The PBMR, which sought to develop intellectual property, deployed no long-term leverage, whilst the other cases with more tangible assets with the exception of Chisumbanje, make significant use of long term debt. Finally regarding the academic literature on the static trade-off theory, Kunt and Maksimovic (1994) are in agreement with the observation in the cases that capital structure appears to be more influenced by agency theory than tax based theory. In this regard the ability of sponsors to convince debt capital providers to advance facilities seems to be the primary agency deliberation.

Support of the pecking order theory premised on information asymmetry by Myers and Maljuf (1984) and Myers (2001) seems to have less applicability in the 7 cases studied. This is because external debt providers arguably have more information on the project relative to listed companies. Debt providers are more actively involved in the capital structure formulation from project planning, and put in place more comprehensive monitoring and reporting systems. As noted in the cases sponsors frequently second their own staff to key positions in the project company, reducing information asymmetry between sponsors and managers. The Seacom case illustrates Allen's (1993) observation that retained earnings may be preferred to preserve flexibility to deploy debt. This application of this observation appears to be of limited application in

the other case studies. However the hypothesis that leverage may be constrained by the non-availability of debt funding is supported and explains the relatively conservative debt levels in all the cases. The proposition that retained earnings may be a preferred funding source so as to maintain the existing control structure (Adedji 1998; Baskin 1989; Allen 1993; Fazzary et al. 1976; Jensen and Meckling 1976) is largely irrelevant in the context of project finance. This is because the equity ownership arrangements are purposefully designed to be stable and largely static. In the 7 cases investigated, the only changes in equity ownership noted were in the ROMPCO pipeline. These were built into the project capital structure from conception, and occurred to facilitate key stakeholders taking a deferred stake in the project company. Whilst Donaldson (1961) and Fazzary et al (1988) argue that retained earnings may be preferable due to transaction costs on debt and equity. This observation has limited applicability in project finance because transaction costs on all capital are typically incurred on financial closure and project commencement. Subsequent retained profits generated are generally not directly competing with other sources of capital. As highlighted in the literature review the transaction costs on project finance are typically very high. In summary, the mainstream capital structure theories seem limited in their explanatory and predictive capability for project and infrastructure finance in Sub-Saharan Africa.

The academic literature does however support a number of the observations of the primary determinants of capital structure in transition economies. The most significant of these appears to relate to the supply of capital and its impact on leverage. Simplistically constrained capital supplies reduce leverage whilst greater access to capital has the effect of increasing leverage. The observations in the cases on capital structure appear to support the observations of Faulkender and Petersen (2006), Sufi (2009), Choi (2008), and Lemmon and Roberts (2010), who observe the effect of capital supply on differential leverage levels in firms. Similar effects were observed in the 7 case studies under consideration, which appeared to be affected by capital supply constraint considerations.

7.1.6 Potential capital structure interventions

This section on potential capital structure interventions will be delivered in two parts based on the top 5 considerations articulated by practitioners in determining capital structure. This first part will detail proposals that could attract more capital to project and infrastructure finance, de-risk such

ventures, and increase capital contributions capacity by equity participants in South Africa, Mozambique, and Zimbabwe. The second part will consider measures that can be taken to enhance project bankability in formulating capital structure.

The first proposal relates to the limited role of private equity firms in the cases chosen. Private equity capital (which is differentiated from sponsor capital e.g. Sasol in the SNGP) was only tapped into for the Seacom project. Private equity capital is significantly underutilised in sourcing of equity capital for project finance. In the case of Seacom some of the private equity participants including Shanduka, Remgro and Convergence, were not specialist infrastructure investors, but were able to determine the merits of the investment case, and commit appropriate equity capital. Unlike traditional private equity funds, these investors did not insist on a predetermined exit time horizon and invested in the project as long-term anchor investors. South Africa has a sizeable private equity sector with significant funds under its custodianship. Interacting with principals in private equity and packaging potential projects within a palatable framework or mandate could potentially attract significant capital flows both from domestic and international sources. The prevalence of private equity funds with exclusive infrastructure mandates in many developed markets attests to the potential of this option. Obtaining a significant portion of the required project capital through upfront payments such as IRU's has the potential to partially address access to capital challenges. Upfront payments would likely only be viable on projects with very transparent and stable revenue streams, where demand and market risk were negligible. These conditions are arguably fulfilled in projects such as Kalkbult and others in the REIPPP, toll roads, and other lower risk ventures. Projects under the REIPPP would be particularly suitable in this regard due to the PPA underwritten by a sovereign guarantee by the South African government.

An explicit distinction between greenfield and brownfield project packaging would also be a highly effective manner to package and promote projects for development. The two most prominent hurdles of accessing capital and de-risking a venture are likely to have been significantly ameliorated in brownfield projects. Brownfield projects also have a track record of financial and operational performance, and socio-economic impact. Institutionalising a capital conduit for brownfield projects that fulfil a prescribed mandate and matching these with potential capital providers could enhance capital flows to projects, and the speed at which financial closure is reached. There are also significant brownfield opportunities in

power reticulation, water provision, toll roads, ports, and airports. This approach would facilitate an incremental approach to attracting capital as opposed to a big bank approach that frequently characterises mega-projects.

The current initiatives supporting infrastructure development including the AfDB, IFC, World Bank, OPIC, and Power Africa are characterised by several weaknesses. To start with these multi-lateral institutions have significant layers of bureaucracy compromising their agility relative to a well-managed private sector investment boutique. Secondly, these institutions are subject to political machinations based on the relationship between beneficiary countries and capital contributing countries. And thirdly, these institutions have a mandate to service the entire Sub-Saharan Africa region, diffusing their focus on states that are most ready and proactive to take advantage of the available support. These weaknesses could be addressed in the following manner. Soliciting and commissioning four regional (Southern, Central, East, and West Africa) private sector boutiques/asset managers that are dedicated infrastructure asset managers. These boutiques would be given a clear mandate to originate qualifying infrastructure transactions. Sub-Saharan countries would need to meet set criteria to be eligible for these funds, similar to the conditions articulated in the Africa Growth and Opportunity Act (AGOA). Asset managers would be compensated based on pre-determined formulae on deals closed, and the operational performance of funded transactions. The weaknesses in the current arrangements would be potentially addressed by reducing bureaucracy through a leaner and incentive based private sector asset manager with a tight mandate. The pre-qualification of countries to the fund would enable political interference to be reduced. In addition the asset managers would be able to focus on those countries that are better prepared to close and execute transactions. A fund of this nature could be a useful conduit to match capital custodians in developed markets suffering from poor and in some cases negative returns on traditional debt investments, with much higher yielding infrastructure investments in Sub-Saharan Africa. The amount of capital disbursed to the asset managers and the size of the book could be increased incrementally based on performance. While all these measures are being done to some degree, the efforts are diluted, fragmented and lack sufficient scale. The approach above would enable focus, agility, and scale-ability.

An additional proposal regarding attracting capital to project finance in Sub-Saharan Africa is the design of financial instruments that allow retail

investors to participate in selected projects that are regulated. By way of example, retail savers and potential investors are excluded from direct investment in successful projects in the REIPPP program as capital contributions are sourced from wholesale markets. Reserving a tranche of each project e.g. 10% for retail investors in lower denominations would enable such projects to broaden their sources of capital. This would also encourage formal savings and investment schemes in local markets, contributing to the development of capital markets. The fact that the REIPPP is highly regulated by the DoE, is funded by domestic banking institutions, and has developers with international reputations, could be leveraged institutionally to ensure the interests of retail investors were protected, just as institutional investors from pension funds hold listed companies to account. In South Africa retail investment products for inflation linked government bonds have been in existence for over 10 years, are well understood, and distributed through the Post Office network. Retail savings could also be used to tap local currency funding in countries such as Mozambique. This could reduce the reliance on dollar denominated capital, support the development of local capital markets, and reduce current account outflows arising from debt service repayments. If in Mozambique for instance a renewable energy project were able to source significant local currency funding, a possible halfway house would be to denominate the tariff in a blend of local and foreign currency.

An important consideration in the capital structure calculus is the foreign exchange exposure. This is particularly acute on large projects that may have hard currency costs, but domestic currency revenues such as the Gautrain. Hedging these large foreign exchange exposures on a project-by-project basis is extremely expensive and can be the determining factor in a project's viability and prospects of reaching financial closure. Accordingly, there are significant benefits to be derived from the establishment of a wholesale foreign exchange hedging platform to achieve economies of scale and reduce costs. All projects on the REIPPP could for example have the option to purchase a rand versus dollar hedge on foreign exchange exposures on an annual basis. Whilst eligible participants could elect to opt out, aggregating the price of the hedge across multiple projects would make it more competitively priced than each project pursuing this route alone. This would also give foreign equity investors greater certainty as to their likely dollar denominated returns over a 12-month horizon.

In Sub-Saharan Africa, the ability to contribute non-monetary capital such as land to project equity as in Chisumbanje could make a significant positive difference in capital structure formulation. In part this is because the region sits with vast tranches of undeveloped land viable for agricultural development. In addition, the capital expenditure to develop agricultural land is generally less intensive such as developing a mineral core body, permitting much greater recognition of the land contribution. The interventions above have the potential to address significantly the three primary considerations and challenges in formulating capital structure articulated by practitioners as access to capital, de-risking the project to make it bankable, and the capital contributions capacity of equity participants.

The second part of this section addresses measures that can be implemented to optimise capital structure. The first proposition in this regard is that project developers should offer capital subscription options that address the different risk appetites and parameters of potential funders. This extends beyond tradition notions of traditional equity, mezzanine finance, working capital facilities etc. The cases revealed that there is a need to stratify potential providers in a manner that include more institutions but also defines in more granular terms the demands of different capital providers. As highlighted earlier long term private equity capital providers appear underutilised, whilst banks may have different views on debt funding. In the SNGP Standard Bank sought to hold the full loan to maturity, election not to syndicate to other banks. Conversely on Seacom, Investec was happy to have amounts outstanding settled earlier than anticipated as the bank had earned significant fees off the transaction and was not focused on book building. Offering capital tranches that appeal to what different equity and debt capital providers are seeking may assist greatly in optimising capital structure. A key consideration in capital structure formulation was frequently state facilitation in the form of sterilising foreign exchange exposures and guarantees. These functions could arguably be more efficiently performed by multi-lateral DFIs including the World Bank, the IFC, and the IMF. Establishing such facilities that can be accessed by infrastructure practitioners in the project conceptualisation stage, and the receipt of a commitment regarding these factors equivalent to a term sheet, could contribute to much more favourable capital structure arrangements. In summary this section proposed measures to attract more capital to project and infrastructure finance in Sub-Saharan Africa, and concluded with interventions that could contribute to optimise the capital structure in these projects.

7.1.7 Conclusion on capital structure

The chapter on capital structure determinants began by interrogating the assumptions of the main capital structure theories and their applicability to project and infrastructure finance in Southern Africa. It followed this with a collation and ranking of the top 5 determinants of capital structure for each of the 7 cases as conveyed by interviewees that participated on the projects. These determinants were broadly classified into access to capital (ability to source and raise requisite capital), de-risking project to ensure bankability, the capacity of capital contributions of equity participants, host government facilitation, and other. The chapter then discussed the divergence between the capital structure theories and the actual practitioner motivations and decisions in the capital structure formulation. A consideration of agency matters between sponsors and managers, and sponsors and debt capital providers in the formulation of capital structure was then discussed. This analysis was capped by proposals to attract more capital to project and infrastructure projects in Sub-Saharan Africa, based on the lessons from the cases in capital structure construction.

The static trade-off and pecking order theories are useful in submitting a theoretical framework for the formulation of capital structure, and positing explanatory and predictive deliberations. However these theories are significantly limited by their underlying assumptions. A review of the academic literature supporting these theories revealed highly mathematical and deductive models with clear explanatory powers and robust predictive capability. Essentially these models applied theory to data. An important weakness of these models included that data that could not be readily cleaned and accurately plugged in mathematically e.g. political transition, different social, business, and economic environment, national aspirations, alternate and dynamic legal systems etc. is excluded. In addition data and information that is incomplete, emerging, and evolving is difficult to capture and thus excluded. Whilst this rationalisation of model inputs enables manageability and convenience, it detracts from the relevance and veracity of model outputs. Specifically, this thesis argues that is extremely difficult to have an overarching mathematically driven model on the determination of capital structure on project and infrastructure ventures in Sub-Saharan Africa. Capital structure is the outcome of a wide array of contextual factors including but not limited to social, economic, legal, political, and geopolitical factors to list a few. The environment in which projects take place is complex and sometimes chaotic. This makes it difficult to capture in existing models, as capital

structure formulation is not simply a mathematical and deductive process. In arriving at each project's capital structure in the 7 cases, the practitioners applied a much broader set of tools including understanding the contextual environment. This allowed them to take into account project and country specific factors, evolving dynamics, apply judgement, facilitate project progression and bottlenecks in accessing capital. Practitioners applied a sceptical attitude to academic theory, and concluded on the capital structure based on a subjective, rigorous, and pragmatic understanding of the prevailing reality applicable to each project.

8 Stakeholder Agency Dynamics

This chapter applies stakeholder agency theory to the 7 case studies in order to investigate how different stakeholders interact with the project company, and how the project company through its management chooses to prioritise engagement with stakeholders. The emphasis is on the descriptive branch of stakeholder theory, that is, how firms actually behave. In this regard, limited reference is made to the normative and instrumental branches. As discussed in the literature review, analysing project participant interactions through the lens of stakeholder agency theory allows a deeper exploration of the multiple factors that influence stakeholder exchanges and decisions. This enables the incorporation of increased complexity to more accurately discern motives, considerations, and resultant actions.

Stakeholder agency theory is especially relevant to South Africa, Mozambique, and Zimbabwe for a number of reasons. Firstly, these countries have a relatively recent experience of colonialism and apartheid. Key features regarding how these societies are structured persist from this legacy of colonialism and apartheid. These countries are characterised by a higher degree of uncertainty and complexity, extreme inequality and poverty, and business organisations are expected to conduct their affairs in a manner in which inclusiveness is imperative. Because these countries are in various stages of social transition, their societies are characterised by heavy contestation by a variety of stakeholders. A key contributor to this contestation is the transformation agenda that post colonial/apartheid democratic governments have sought to implement, to address the structural remnants of their difficult history. These governments seek to direct economic development in societies with deep social fissures, develop the strategic capacity to define the vision and course of social development, and where necessary make difficult choices to ensure decisions are implemented. Legitimate vision and goals may however be compromised by a number of factors including poor organisational and state capacity, resistance from incumbent beneficiaries of the status quo, and corrupt actors within the state that intervene to undermine state processes in governments departments, regulators, and state-owned enterprises. This cocktail of factors has an important influence on how stakeholder interactions occur within these societies, and the state institutions that regulate project and infrastructure finance ventures.

This chapter will begin by restating the factors that inform how to analyse stakeholder relationships based on stakeholder agency theory. The aim of

this will be to frame the nature of the relationships between the project company and each stakeholder, and understand how stakeholders are prioritised, using stakeholder agency theory as the basis. This process will inform the drafting of a matrix for each case study that captures in a single picture the overarching stakeholder environment including stakeholder characteristics, salience, mandate, resources available, and strategic alliances, level of interest, and access to other stakeholders. The matrix will consider 5 key stakeholder categories relative to the project company, namely, sponsors, managers, contractors, government and state institutions, and community representatives including environmental organisations (agency issues between debt capital providers and sponsors were examined in chapter 7). An examination and analysis of each project's matrix will then follow, with insights and observations documented. The insights obtained from the cases will then be used to extract and compile an overarching explanation of the main factors influencing priority for engagement in the cases, and potential interventions to improve stakeholder interactions within the countries in which the projects were executed.

8.1 Analysing stakeholder relationships

In analysing stakeholder interactions applying stakeholder agency theory, and determining the priority of engagement amongst multiple stakeholders, five key factors require determination and consideration. These are the level of power/importance, the level of interest, the resources available, linkages, and access, of each respective stakeholder. A consideration of all these factors allows a determination to be made as to the priority for engagement. The level of power for a stakeholder is decided by the ability of a stakeholder to influence or hinder progress towards the project objectives. Power levels may change based upon the stage of the project. The level of interest is determined by an evaluation of how high the goal in question is in the stakeholder's priorities. The level of interest can be further broken down into two features, namely urgency and mandate. Urgency will capture the importance of swift action by the stakeholder, and mandate will capture the level of legitimacy and official claims a stakeholder may have. Higher power and higher interest stakeholders are likely to be prioritised for engagement. Low power and low interest stakeholders are likely to have low priority for engagement. It can be reasonably anticipated that stakeholders with a high level of interest but low power relationship will be kept informed of progress. Stakeholders with high power and low level of interest are likely to be kept

satisfied with overall progress through on-going information and involvement in planning.

The resources available to a stakeholder is a consideration of the levers at the disposal of the stakeholder to enable optimal progression of the project, or to compromise project progression, and effectively hold a venture to ransom. The resources and capabilities stakeholders have at their disposal will constrain their actions. Links between stakeholders consider what relationships a stakeholder has with other stakeholders and the nature of these relationships. This would include alliances in operation between stakeholders and conflicting interests between stakeholders. The ease of access each stakeholder enjoys to other stakeholders can also support or inhibit the engagement process. Access considerations may include whether the senior leaders of the stakeholder group can be contacted, and whether face-to-face engagement is impractical due to geographical constraints. Once all these dynamics have been accounted for a single picture of the overall stakeholder environment can be developed and captured in a matrix. From this can be derived a priority for engagement plan based on an evaluation of these 5 factors. Tables 8.1 to 8.7 below capture and reflect a matrix for each of the 7 case studies. This is accompanied by discussions regarding how the ratings for each stakeholder were arrived at for each factor, and the priority for engagement attributed to the respective stakeholder, based on the facts and insights extracted from the applicable project

8.2 Stakeholder analysis in the cases

Seacom

Table 8.1 below captures the five factors that culminate in the prioritisation for engagement for Seacom. The sponsors enjoyed a high level of importance on the project. Sponsors included the project conceptualiser and developer, equity capital providers, and highly regarded established organisations. As a collective they had the power to not only pursue or terminate Seacom's commissioning, but remained integrally and actively engaged in operational activities after project launch. The level of interest of the sponsor was high both regarding urgency and mandate. From an urgency perspective sponsors sought to take advantage of the transient opportunity of no competition that Seacom sought to capitalise on. As conceptualisers and active promoters and developers of the project the legitimacy and mandate were also high. Sponsors enhanced their mandate by incorporating a 76.25% African ownership. The resources available to the sponsors were extensive. In addition to equity

Table 8.1: Seacom Prioritisation of Stakeholders

Stakeholder	Level of power or importance	Level of interest		Resources Available	Links	Access	Priority for Engagement
		Urgency	*Mandate*				
Sponsors **(S)**	High	High	High	Many	Ally with M	Good	High
Management **(M)**	High	High	High	Many	Ally with S	Good	High
Contractors **(C)**	High	High	High	Few	-	Good	Medium
Government/State Institutions **(G)**	Medium	Medium	Medium	Few	Ally with CO	Medium	Medium
Community **(CO)**	Low	Low	High	Few	Ally with G	Poor	Low

Key
High priority factor
Medium priority factor
Low priority factor

capital, the sponsors possessed deep technical expertise on undersea cables, and the commercial determinants of success and failure in such enterprises. The sponsors also enjoyed an extensive network of contacts in terms of EPC contractors in undersea cables, debt capital providers in the form of banks in South Africa and beyond, and external access to decision makers including political principals and regulators. In terms of links between the different stakeholders, the differentiation between the sponsors and the executive management team in Seacom was blurred. The executive management team in the project team was effectively deployed from sponsors and referring to links between the two understates how conflated sponsors and management were in the project. Sponsors therefore had extensive direct internal access to the other stakeholder groups. Of all the stakeholders in the Seacom project, only the sponsors wielded sufficient power to solely stop the project. Accordingly sponsors are allocated a high priority for engagement. Importantly the high priority for engagement with sponsors remained after the project was operationalized due to their presence in the executive management team, and on-going active involvement.

The management of the Seacom project possessed a high level of importance. In part this was on account of their direct relationship with the sponsors detailed above. But in addition the managers were entrusted with executing the project strategy, and dealing with operational issues that had the potential to compromise the project including accidental cable damage, client relationship management, and brand reputation. As the primary point of contact with other stakeholders, the management team on Seacom were essential in co-ordinating activities, and competing demands that the project faced. As owner managers the level of interest was high both regarding the urgency of the tasks being performed, and mandate as they had the dual roles of being owners and custodians. The resources available to the management team included those enjoyed by the sponsors above, and also information on the day to day operations of the company including developments in marketing and securing clients, tariff patterns as new entrants came into the market, trends in data usage, challenges in linking with end users in landlocked countries, and other key operational aspects that impacted significantly on the project. As a close ally to the sponsor, and with strong relationships with suppliers, regulators, political principals, management links in Seacom are strong. Internal access to other stakeholders was also good as management was the primary conduit to interact with the project company, including monitoring and enforcing contractual agreements, and compliance with applicable regulations Accordingly the priority for engagement with the management

team is rated as high. The level of importance of contractors is observed as high. This due to the fact that contractors played the essential role of mapping the seabed cable route, laying the cable, and installing and commissioning related cable landing equipment that would render the project operable. A failure by the contractors to fulfil their contractual obligations could have sabotaged or delayed the project. The urgency with which these contractors carried out their obligations was high. This was in part contributed to by the fact that the cable laying industry was in a recession that had persisted due to the massive investment and overcapacity in the late 1990's and early 2000s. The mandate of EPC contractors was high as they were legitimately contracted. The resources available to contractors were few in the sense that they could during a brief window threaten to suspend or terminate the work being done on laying the cable. This threat was significantly deterred by the signing of a turnkey contract that capped the amount that would be paid for the services rendered, together with offering incentives for timely and early completion. Beyond the contracts signed the contractors appear to have had very limited links with the other stakeholder categories. Contractors enjoyed good internal access particularly to sponsors and management during the planning, laying and operationalization stages of the cable. After contractors had fulfilled their contractual obligations and the Seacom project was live and stable, this access diminished and the level of importance, interest, and access dropped significantly. Accordingly the priority for engagement with contractors has been rated as medium. It would have been high in cable construction, but suffer a steep decline thereafter to medium, due to the low level of involvement required from contractors in daily operations.

Government and state institutions across all the countries had a medium level of importance. Governments were key to obtaining regulatory approval to establish landing points. However, once this approval was obtained the importance of these authorities waned significantly. Some governments such as the Tanzanian authorities continue to wield higher importance due to the fact that they have not liberalised their telecommunications sectors, and can therefore significantly influence the scope of Seacom's operations. The level of interest for both urgency and mandate were medium because there was no direct financial or related participation in the project's conceptualisation and roll out. Government's however had the incentive and opportunity to co-operate with the project developers to enable their populace access to more affordable data. The resources of the respective governments were few and mainly in the form of regulatory landing permissions and other industry protocols. An implicit

link existed between the governments and their populations who would be the final consumers of data. This link was however tenuous as there were no recognised and powerful formal social organisations mobilising on the Seacom cable specifically. Governments enjoy medium access to other stakeholders, mainly in the form of regulatory prescriptions. On account of these considerations the priority for engaging with government is rated medium.

Community organisations on Seacom had a low level of importance. In part this was due to the low environmental impact and physical presence of the cable. Another contributor was that communities were generally not formally mobilised regarding Seacom, and interactions were largely with state representatives. Due to their limited knowledge of the cable implications the level of urgency was also low, despite the fact that as final consumers the mandate would have been high. Resources available to community participants were few and largely in the form of voice and appeals to representative state officials. In this regard a loose link existed between the states and communities, but this was not evidenced to be used to any significant effect. Access of community organisations was poor, in large part due to the fact that community organisations were not formalised and their interactions with other stakeholders therefore diffuse. On account of these observations, the priority for engagement with communities is rated a low.

Gautrain

Table 8.2 below captures the five factors that culminate in the prioritisation for engagement for the Gautrain. The Gautrain is peculiar in having government institutions as sponsors, and the state also carrying out regulatory and facilitation initiatives. As a result these two stakeholders will be looked at jointly. The sponsors of the Gautrain in the form of the South African government and the Gauteng provincial government have a high level of importance. In addition to conceptualising and developing the Gautrain, the sponsors furnished 72% of the capital in the form of equity injections. Similarly the government has high importance as it effectively underwrites the annual patronage agreement, and provides on-going political support. Political support is essential as the project consumes a significant portion of the province's transport budget, and the Gautrain cannot be sustained without this. State institutions were also essential in facilitating the Gautrain by sterilising its foreign exchange exposure that threatened to sabotage the project, and for ensuring robust conceptualisation through the prescribed PPP process done via the national treasury. The urgency and mandate of the sponsors/government

Table 8.2: Gautrain Prioritisation of Stakeholders

Stakeholder	Level of power or importance	Level of interest		Resources Available	Links	Access	Priority for Engagement
		Urgency	*Mandate*				
Sponsors **(S)**	High	High	High	Many	Ally with M and G	Good	High
Management **(M)**	High	High	High	Many	Ally with S and G	Good	High
Contractors **(C)**	High	High	High	Some	Conflict with M	Good	High
Government/State Institutions **(G)**	High	High	High	Many	Ally with S and M	Good	High
Community **(CO)**	Medium	Medium	High	Few	-	Poor	Medium

Key
High priority factor
Medium priority factor
Low priority factor

are high as the plan was to have the project operational by the 2010 Soccer World Cup, and the government authorities have a mandate to develop mass transit infrastructure. The resources available to sponsors/government were many including financial, access to political and business principals, and organs of state. The sponsors/government also had an effective alliance with management through the GMA, that was mandated to oversee the interests of the province on the Gautrain, monitor the Bombela consortium, and ensure contractual obligations were met. Internal access to other stakeholders is good and bolstered by the alliance with the GMA regarding operational matters. Sponsors/ government have a high priority for engagement, as they were essential to the commissioning of the Gautrain, are essential for its continued operations, and together with the alliance with management are arguably the most influential stakeholders.

Management on the Gautrain is housed in the GMA that has a high level of importance because it monitors the Bombela consortium regarding infrastructure and rolling stock deliverables, operational performance metrics and strategy, brand reputation and media coverage, customer relations management, documentation and contractual management to name a few key tasks. As a dedicated agency enforcing legal agreements, the GMA is the nexus through which stakeholders interact. The level of interest both in terms of urgency and mandate of the GMA is high as it is a provincial entity reporting into the provincial government. Resources available to the GMA are many including law (including arbitration), penalties as determined in the contracts, and the ability to withhold disbursements of amounts via the patronage agreement. In addition the GMA has a formidable and effective administrative infrastructure to execute required actions. The alliance between the GMA and sponsors/government enhances its legitimacy, whilst allowing it to function autonomously. The GMA enjoys good access to all stakeholders as the nexus of all matters relating to the Gautrain. The priority of engagement for management on the Gautrain is consequently high.

Contractors have a high level of importance on the Gautrain. This first stems from the fact that contractors were essential in the planning and construction of a very sophisticated venture. However, even post construction the operating company in the Bombela consortium is very important because it runs and operates the Gautrain under a concession arrangement. In this regard contractors may be split into two categories. The first category relates to contractors involved solely in the construction of the system with no residual interest post-construction. The second

category is of contractors that have a significant interest in the operational phase. The former's importance diminishes post construction whilst the latters high importance remains intact. The urgency and mandate of the contractors is high as the project was significant in their portfolio of activities and they were mandated to perform these functions after the Gauteng provincial government had followed due process. The resources available to the contractors relate to the fact that the skills required to assemble a system such as the Gautrain (rolling stock, signalling equipment, electronic systems etc.) are held by a handful of companies internationally. The number of competitors is thus limited. In addition, the management of the system over the 20-year contractual mean that the relationship with the sponsors is long term in nature, and there are significant barriers to switching operating companies or equipment suppliers and specifications. Therefore while the resources of the contractors may be limited to operating the system after construction, this is an essential input for the system to perform. The conflict between Murray and Roberts (a member of the Bombela consortium) and the GMA regarding water seepage in the Rosebank underground leg of the railway line strengthened the alliance between sponsors/government and management. The internal access of the contractors is good to enable seamless communication on matters. Contractors therefore enjoy a high priority engagement, as they were essential to the assembly of the project, and to its continued operation.

The community had a medium level of importance on the Gautrain. Firstly, community participation on the proposed Gautrain was a prescribed requirement, and land had to be nationalised to enable servitudes and lines to be laid. The community also had a medium level of importance, as specific portions of it would be the users of the facility. The importance of the community does not appear to have been high because a large, organised and formalised community representative organisation did not emerge, and the sponsor/government alliance decisively advanced the project. Community urgency was also medium and largely restricted to parties inconvenienced because their land was the subject of mandatory expropriation, people who feared the effect of the systems proximity on the valuation of residential properties, and those inconvenienced by the disruption caused by construction. The mandate of the community on the Gautrain is high as it is directly impacted on both in terms of positive developments and negative ones. The resources available to community organisations were few and mainly in the form of legal interdicts and complaints via the media (voice). The media complaints were highly effective in getting the attention of the GMA. Overall internal access by

community groups was poor on account of their diffuse nature. The rating for priority engagement for the community on the Gautrain was medium.

PBMR

Table 8.3 below captures the five factors that culminate in the prioritisation for engagement for the PBMR. As with the Gautrain there is a conflation between the sponsors and government/state institutions so these will be discussed jointly. The key sponsors of the PBMR in the form of the South African treasury and contributors including Eskom and the IDC had a high level of importance. Their regular financial contributions were essential in commencing and continuing the project. Similarly, on account of the funds expended the sponsors attached a high level of interest (both positive and negative) to the project. The PBMR enjoyed initial support from key government officials, Eskom as the national electricity company, and the IDC. This enabled it to have a medium mandate. The mandate was not high as South Africa had competing priorities and the nature of the project was exploratory. Similarly the urgency applied by state institutions was medium due to a lack of buy in and conviction regarding the project. The sponsors/government enjoyed moderate/some resource availability in the form of funding, and being able to engage and co-operate with other organs of state with varying degrees of success. Technical resources were however limited to those in South Africa largely under the employ of the PBMR company and NECSA, with little international input. Despite extensive links between sponsors, state institutions and the management of the PBMR company, these were compromised because these stakeholders were frequently both allies and adversaries. This included matters relating to the specifications of the PBMR, funding, reporting lines, and responsibility and accountability. Access to internal stakeholders enjoyed by sponsors and state institutions was high, despite questions regarding how well this access was used or under utilised. In summary the priority for engagement of sponsor/government is high as these stakeholders initiated the PBMR, enabled subsequent financial and related support, and ultimately made the decision to terminate the project.

The management of the PBMR was compromised in terms of their importance because they lacked the institutional/technical capacity to monitor the project effectively and implement rigorous project management procedures. In addition, their focus was distracted by the need to formalise and stabilise the departments within the PBMR company. Management's ability to steer the PBMR company towards its core objective of commercialising a mini nuclear reactor were significantly curtailed.

Table 8.3: PBMR Prioritisation of Stakeholders

Stakeholder	Level of power or importance	Level of interest		Resources Available	Links	Access	Priority for Engagement
		Urgency	*Mandate*				
Sponsors **(S)**	High	High	Medium	Many	Ally/Conflict with M and G	Good	High
Management **(M)**	Medium	High	Medium	Some	Ally/Conflict with S and G	Good	High
Contractors **(C)**	Medium	Medium	Medium	Some	-	Medium	Medium
Government/State Institutions **(G)**	High	Medium	Medium	Many	Ally/Conflict with S and M	Good	High
Community **(CO)**	Low	Medium	Medium	Few	Conflict with S, M, G	Low	Low

Key
High priority factor
Medium priority factor
Low priority factor

Management did have some resources available in the form of significant but erratic financial support, and an experienced and skilled technical and scientific team. The ability to access external resources was however limited. The management of the PBMR had conflicts and allies with sponsors and state institutions, together with environmental organisations against nuclear energy, diluting the potential benefits that could be derived from these links. Overall internal access was good despite being characterised by resistance and disagreement in a number of respects. The factors for consideration would initially appear to indicate a medium priority for engagement for the management team of the PBMR. The researcher submits that this would be erroneous because the matrix captures deficiencies in management and overall project management of the PBMR with hindsight. If these deficiencies had been significantly addressed, and management rendered effective, a high priority for engagement is appropriate. Contractors for the PBMR were required to manufacture bespoke parts and components for the reactor. The contractors have a medium level of importance mainly because they were essentially outsourced service providers with very little integration into the project beyond set purchases. Most contractors were also interchangeable and wielded limited exclusivity power. Contractors therefore have a medium level of importance. There were a few exceptions including the American contractor tasked with manufacturing the pebbles. Overall, contractors were limited in terms of the overall project and of medium importance. As a result of the arms-length arrangements with contractors addressed above the urgency and mandate of the contractors was also medium. Contractors were largely restricted to their own internal technical resources, with the PBMR company communicating the required specifications, and therefore categorised as having some resources available. Contractors had negligible links to other stakeholders in the project, and their access to the PBMR company was good. The priority for engagement for contractors is medium as they were not integral to the project development, were largely interchangeable, and commissioned by way of arms length, short term, supply contracts.

The community level of power was low in part because community organisation was limited in scale and its ability to mobilise significant numbers of participants. Because the PBMR was still in development stage the urgency was also medium. The mandate of community and environmental organisations was also medium on account of limited participant mobilisation. Resources available to community organisations were limited and largely limited to educational initiatives to mobilise participants and reporting in the media. The community organisations,

being anti-nuclear, were in conflict with sponsors, state institutions, and the management of the PBMR company. Their internal access to other stakeholders was poor, and largely restricted to formal regulatory consultative sessions. On account of these observations, the priority for engagement with community organisations in the PBMR was low.

Kalkbult

Table 8.4 below captures the five factors that culminate in the prioritisation for engagement for Kalkbult. The sponsors to Kalkbult possessed a high level of importance. In addition to providing 25% of the project capital requirements sponsors possessed international solar project development technical skills and experience, a deep understanding of the South African economy and related capital markets, and legitimacy in the community in which the project was located. The urgency of sponsors was high in order to firstly participate and win in terms of the process prescribed in the REIPPP, and having been selected as a winning bidder, executing the project and commencing operations within the set terms. The mandate of the sponsor consortium was high based on the fact that it was a successful bidder in credible and transparent bidding process, its demonstrated technical capability, and its representative nature including community and a women's group. The resources available to the consortium were many. These included the technical capability of Scatec, the extensive use of technical, financial, and legal advisers, strong balance sheets, and established networks in South African capital markets and with EPC contractors. The sponsors in Kalkbult established strong alliances with management and community groups (including having selected community groups as equity shareholders). Access to internal stakeholders by sponsors was good and entrenched by the close association between the sponsors and management team. On this account the priority for engagement with sponsors was high.

The management team had a high level on power in part because of the close association with the sponsor by way of the operating company being staffed by Scatec seconded executives. In addition, post construction the plant was not labour intensive allowing management to monitor most key performance indicators remotely via satellite and effect most remedial actions electronically through the same medium. The urgency of management was high based on the prescribed timelines in REIPPP and the intent of sponsors to execute the project within budget, on time and fulfil operating specifications.

Table 8.4: Kalkbult Prioritisation of Stakeholders

Stakeholder	Level of power or importance	Level of interest		Resources Available	Links	Access	Priority for Engagement
		Urgency	*Mandate*				
Sponsors **(S)**	High	High	High	Many	Ally with M and G	Good	High
Management **(M)**	High	High	High	Many	Ally with S and G	Good	High
Contractors **(C)**	Medium	High	High	Some	-	Medium	Medium
Government/State Institutions **(G)**	High	High	High	Many	-	Good	High
Community **(CO)**	Medium	Medium	Medium	Some	Ally with S	Medium	Medium

Key
High priority factor
Medium priority factor
Low priority factor

The mandate of management was also high due to the formal awarding of the successful bid to the project by the DOE. While the focus of resources for management related to the commissioning of EPC contractors in the project implementation, and managing operational performance post connection to the Eskom grid, the management team had access to most resources available to the sponsors including technical advisers and capital. As such many resources were available to the management team. A strong alliance was established between the management team, sponsors and community organisations (in particular the equity shareholders in the sponsoring consortium). Management also enjoyed good access to all internal stakeholders as the focal point of most interactions. The overall prioritisation of management was therefore high.

Contractors to Kalkbult had a high level of importance particularly in the construction and assembly faces. Post connection to the Eskom grid and operations reaching steady state, this importance declined significantly as management was able to operate the plant independently. The inter-changeability of EPC contractors and equipment suppliers rendered them of medium importance. Contractors had a high degree of urgency and mandate on account of the incentives and penalties incorporated into the contractual arrangements, and because of the strict deadlines prescribed in the REIPPP bid award conditions. Contractors had some resources in the form of their technical, construction and engineering capacity to execute the venture. Beyond these capabilities, resources to influence other stakeholders were limited. No significant alliances were observed between contractors and other internal stakeholders, and while contractors enjoyed good access to management, access to other stakeholders was limited, and overall medium.

The government's power in Kalbult was high due to the fact that through the DOE it ran the REIPPP, regulatory agencies vetted and approved the EIA and EMP, Eskom, as a state owned company issued the PPA, and the state guaranteed the PPA. The level of urgency in the government was high due to the severe electricity shortage in the country, and the need to demonstrate credibility with respect to the implementation of key policies. As a democratically elected government trying to achieve a desired outcome security of supply in electricity, the government mandate was high. Government had many resources available. It commissioned independent technical, financial, accounting, and legal advisers in the design and execution of the REIPPP. It also mobilised organs of state including Eskom, the IDC and the DBSA to effect actions necessary for the REIPPP to proceed successfully. Its links to other stakeholders in the

form of alliances are absent as the state played the role of enabler and referee. Access to internal stakeholders within Kalkbult by the state was good and overall the government enjoyed a high priority for engagement.

Community organisations had a medium level of importance. Whilst the REIPPP conditions made community participation mandatory, the project developer could choose which community group they partnered with. The urgency for the community was high due to the potential for socio-economic development particularly employment opportunities. The community mandate was also high as it demonstrated the project was inclusive and fulfilled regulatory requirements in Kalkbult's case by having 20% of the equity in a community trust and women's group. The community had some resources available to it in the form of financial and advisory support from the DBSA and IDC, and the fact that the DOE reviewed the terms of community groups partaking in the equity of Kalkbult. The community equity shareholders established a strategic alliance with the other sponsors and had medium internal access to other stakeholders. A medium priority for engagement could be attributed to community organisations.

Mozal

Table 8.5 below captures the five factors that culminate in the prioritisation for engagement for Mozal. The sponsoring consortium enjoyed high importance in Mozal. In addition to providing the equity capital, consortium members had vast technical and operational skills essential to the project, were vital providers of feedstock and off-takers to the final product, and essential to the entire value creation process entailed in the aluminium smelter. The urgency of the sponsoring consortium was also high on account of the fact that significant resources had been directed by sponsors to develop the concept, raise funding, negotiate terms, and bring the project to fruition. The on-going support obtained from the Mozambican government including favourable tax terms gave sponsors a high mandate. Resources available to the sponsors were many and included an international network of commodity suppliers and aluminium buyers, technical and operational capacity, relationships with political principals in Mozambique and South Africa, significant balance sheets, and extensive organisational infrastructure and capacity that could be directed towards the Mozal project. The sponsors enjoyed an alliance with the management team by virtue of BHP being the largest sponsor and also operating the plant, and had an ally in the Mozambican authorities that sought to use Mozal as a flagship to attract international investment.

Table 8.5: Mozal Prioritisation of Stakeholders

Stakeholder	Level of power or importance	Level of interest		Resources Available	Links	Access	Priority for Engagement
		Urgency	*Mandate*				
Sponsors **(S)**	High	High	High	Many	Ally with M and G	Good	High
Management **(M)**	High	High	High	Many	Ally with S and G	Good	High
Contractors **(C)**	High	High	High	Some	-	Good	High
Government/State Institutions **(G)**	High	High	High	Some	Ally with S and M	Good	High
Community **(CO)**	Low	Low	Low	Few	-	Low	Low

Key
High priority factor
Medium priority factor
Low priority factor

The internal access of the sponsors with other stakeholders was good in part due to the close proximity with management. Due to these factors the priority for sponsor engagement was high.

Management also enjoyed a high level of importance, as it was responsible for operating the plant based on the management agreement awarded to BHP. Based on earlier projects executed at Bayside and Hillside in South Africa, the management team brought extensive experience and technical capability. The management contract incentivised efficiency by linking compensation to the profitability and efficiency of the smelter. The urgency and mandate of the management team were high due to two key features. Firstly BHP as sponsor and manager of the plant benefited more than any other party from completing the plant within budget, and the smelter operating as efficiently and profitably as possible. Secondly, BHP's 47% stake as sponsor re-enforced this alignment of interests in the management contract. The resources available to the management team included all the human resources and technical capacity within the plant. It however also extended to resources and skills residing in other sponsors which management had access to. The management team was strongly allied to the sponsors and the government and state institutions giving it good internal access to all stakeholders. As a result the priority for engagement with the management team was high.

The main contractors in the form of Pechiney, Murray and Roberts and S&C Love, had a high level of importance particularly in the construction and assembly faces. Post operations reaching steady state, this importance declined significantly as management was able to operate the plant independently. The urgency of the contractors was high as the sponsors particularly BHP represented significant and recurring clients. The mandate for contractors was also high due to the same parties being contracted on earlier projects with BHP. The contractors had some resources available to them mainly within the parameters of their construction, technical and engineering expertise, and their ability to deploy these internationally. The equipment provided by Pechiney was state of the art, and once fitted would be difficult to change to other equipment providers. In addition the turnkey arrangements and time completion incentives on the construction of the plant, and fitment of the smelter supported expeditious execution. Beyond these other resources were limited. The contractors do not appear to have had links and alliances with the other stakeholders except via the contractual arrangements with the project company. The access of the contractors to

internal stakeholders particularly sponsors and the management team was good. Because of the importance of timely completion within budget, and ensuring the plant performed in accordance with specifications set, the priority for engagement with contractors was high.

The government and related state institutions had a high level of importance in the establishment of Mozal. Firstly, the government was responsible for issuing a number of regulatory prescriptions that enabled to project including exemption from corporate tax, permits and operating licenses, a fast track import and export regime for incoming feedstock and out going aluminium ingots, offshore banking authorisation, access to ports, and other interventions that removed potential blockages on the project. The urgency of the government was high as it sought to accelerate economic development in Mozambique, and use the Mozal project as a flagship to attract foreign investment. Similarly the mandate of the government as a democratically elected representative of the Mozambican people was high. The government had some resources available to it largely in the form of granting regulatory concessions, internal political support, and external political contacts with the South African government. It had very limited financial, technical, and other resources that could assist the project. The Mozambican government was closely allied with both sponsors and managers of the project, and had good access to all the internal stakeholders.

Community organisations had a low level of importance on Mozal. In part this was due to the fact that the project was localised to within a particular area that was sparsely populated at the time the project was commissioned. In addition the community groups appear to have had limited organisational capacity. The urgency with which community groups responded to Mozal was low, in part because the project was new and novel, and the outcome of the project and expectations were not clearly established. In addition the mandate of community organisations was also low as the project was seen as a national initiative as opposed to a local or community initiative. The consequence of this was that the mandate and legitimacy of Mozal resided more with the national government as opposed to community organisations. Community protagonists had limited resources available in part because of the constrained financial situation. The most powerful resource was arguably voicing community interests through the public participation process and related EIA compelled by funding from the IFC, and accessible media channels. There was an absence of alliances between community organisations and other stakeholders, whilst access to other stakeholders beyond regulated and

prescribed channels is low. Based on these factors priority for engagement with community organisations was low.

SNGP

Table 8.6 below captures the five factors that culminate in the prioritisation for engagement for SNGP. Sasol was the dominant and most important sponsor in the SNGP. References to sponsors in this case can largely be attributed to Sasol itself, with a residual element attributable to other sponsors who played a much smaller role. A significant aspect supporting Sasol's high power status stemmed from the fact that it participated in the entire value chain from gas exploration, extraction and processing, to transportation through ROMPCO, and receiving the feedstock at its plant in Secunda. No other stakeholder (including other sponsors) participated in the value chain to this degree. This dominance of the project by Sasol in part stemmed from the fact that it had conceptualised and actively developed the project and decided what the scope and objectives would be. It can be argued that other sponsors were brought in to facilitate and de-risk the venture, but added limited value in terms of the main motivations driving the venture. Sponsors had high urgency for two main reasons. For Sasol the SNGP was a significant capital investment integrated into its core operations in Secunda, and therefore essential to its overall operations. For other sponsors this was an important opportunity to attract further investment into Mozambique's transitioning political environment and economy. Furthermore, the project opened up new commercial opportunities for sponsors such as iGas and ENH and CMG. The legitimacy and mandate of the sponsors was high English on account of direct and indirect South African and Mozambican government ownership in all parts of the project. In addition the South African government had significant indirect holdings in publicly listed Sasol by way of the state pension fund and the IDC. The resources of the sponsors were extensive. In addition to the operational, technical, scientific, financial and human resources within Sasol, the incorporation of ownership stakes by government institutions in South Africa and Mozambique gave the sponsoring consortium access to a network of political principals, regulators, and decisions makers who pro-actively tool action that facilitated the project execution. Sponsors possessed strong alliances with management, as a significant proportion of this team was Sasol employees delegated to the project, and government institutions due to their direct and indirect interests in the project.

Table 8.6: SNGP Prioritisation of Stakeholders

Stakeholder	Level of power or importance	Level of interest		Resources Available	Links	Access	Priority for Engagement
		Urgency	*Mandate*				
Sponsors **(S)**	High	High	High	Many	Ally with M and G	Good	High
Management **(M)**	High	High	High	Many	Ally with S and G	Good	High
Contractors **(C)**	High	High	High	Some	-	Good	High
Government/State Institutions **(G)**	High	High	High	Many	Ally with S and M	Good	High
Community **(CO)**	Medium	Medium	Medium	Few	-	Low	Low

Key
High priority factor
Medium priority factor
Low priority factor

Access to other internal stakeholders was good on account of the sponsors powerful position as an enabler with close alliances to management and government institutions, a highly legitimate mandate, and with extensive resources. The priority for engagement for sponsors was therefore high. Management enjoyed a high level of importance across the project parts largely due to the fact that its technical skills in formulating and executing the project were critical to project success. In addition, the executive management team was sourced from Sasol and therefore enjoyed strong support from the primary sponsor. The urgency of the management team was high as the SNGP was a significant capital investment in the Sasol portfolio, and would affect the core operations at the Secunda plant. Furthermore, due to Sasol's position as the primary sponsor, the legitimacy and mandate of the management team was high to execute as planned and approved. The resources available to the management team included all the resources available to the sponsors including the operational, technical, scientific, financial and human resources within Sasol, and the co-operation of state institution in the overall project implementation. The management team possessed strong alliances with sponsors and government, and had good internal access to all stakeholders as a focal point of interactions amongst participants. The priority for engagement with the management team was therefore high.

Contractors played a highly important role because all three legs of the project required effective engineering, procurement, and construction to ensure project success. In addition the manufacture of the pipeline added to the importance of contractors. To dilute the importance of an individual contractor, Sasol constructed the two consortiums dealing with EPC and pipeline manufacture respectively. Each consortium had multiple contractors that could mitigate disruptions caused by any other contractor failing to fulfil its obligations. The contractors were also sourced from a spread of national jurisdictions further reducing concentration in contractor exposure. In addition to incentivising contractors and managing costs by signing turnkey contracts, the contractors were protected from exposure to non-technical risks such as obtaining servitudes on the pipeline route and other regulatory approvals. The urgency for the contractor consortiums was high as the value of the project was significant by international standards and Sasol was an important global client. In addition contractors enjoyed a high mandate based on the legal agreements signed and the overall legitimacy of the project garnered by the sponsors. Resources available to contractors are categorised as moderate/some as they had extensive technical resources, strong financial and balance sheet support, and legal recourse in the form of the contractual arrangements. Beyond

these the resources of the contractors were limited. In addition the turnkey and incentive based contracts encouraged speedy resolution of any difficulties or disagreements. The contractor consortiums lacked any allies of note amongst the other stakeholders. Of necessity they enjoyed good access to the sponsors and management team, but limited direct access to state institutions and community as these interactions were co-ordinated by management. This resulted in medium access. The priority for engagement for contractors was high due to their essential role in the EPC on all stages of the project. Post completion and successful operationalization, the level of importance would have declined significantly.

State institutions form both the Mozambican and South African governments possessed high levels of importance as enablers of the SNGP. From the granting of exploration rights, to the issuance of an extracting license, regulatory approvals for the pipeline including the gas transportation agreement, and finalising a gas sales and tariff formula to name a few. The level of urgency and mandate in state institutions was high due to policies that encouraged regional economic integration, and the support of influential political principals in the executive branches of both democratically elected governments. The resources available included organs of state in both the executive and legislative branches, and the networks (internal and external), influence, and decision-making powers associated with these organs. State institutions had alliances with both sponsors and management, and good access to all internal stakeholders due to their facilitation role. Due to state institutions holding key levers that facilitated this project, their priority for engagement was high.

Community organisations possessed medium importance in the SNGP. In part this was due to the fact that the project's footprint and potential for disrupting community activities was significantly mitigated by laying the pipeline underground. The urgency and mandate of community organisations was also medium due to very few immediate corrosive or negative implications of the SNGP, and the dispersed nature of affected communities reduced to ability to secure a high mandate. Resources available to community organisations were few, with significant reliance on project management, sponsors and state institutions for information. The impoverished situation of many of these rural communities ensured they lacked financial resources, and the lack of coherent organisation a loud and influential voice. There were notable alliances between community

organisations and other stakeholders, and the access of community organisations to other internal stakeholders was low. The priority for

Chisumbanje

Table 8.7 below captures the five factors that culminate in the prioritisation for engagement for Chisumbanje. The substantive sponsors of Chisumbanje were Green Fuel and the government of Zimbabwe through the land provision enabled by state owned entity ARDA. The level of power of the sponsors was high as project developers not only conceptualised, developed, raised capital, and secured political support for the venture, but also exerted indirect influence across key regulatory institutions that were essential to the establishment and continuation of Chisumbanje. The urgency for sponsors was high once a decision had been made to proceed, as significant resources were committed. The mandate of GreenFuel was low as it was simply a private investor with the individuals owning Green Fuel having a questionable ethical and moral business past. The incumbent Zanu PF government of Zimbabwe was also facing challenges regarding its political legitimacy, culminating in elections in 2008 that resulted in a government of national unity, and the mothballing of the project. Resources available to the sponsor included technical skills to develop and operate an ethanol plant, capital to procure related equipment from Brazil, access to significant tracts of government held land, and an integral alliance with politicians in the governing party.

The combination of Green Fuel and the Zimbabwean government meant sponsors had many resources at their disposal. Sponsors possessed strong alliances with management and state institutions. This resulted in good access to all internal stakeholders and a high priority for engagement. The sponsors on Chisumbanje therefore had a high priority for engagement. Management and one of the sponsors Green Fuel are conflated in Chisumbanje. The executive management team and key positions in the operations of the plant are both sponsors and managers to the project. As a result, management possesses high levels of importance. The urgency for management was high due to the fact that the management team was constituted to develop and manage the Chisumbanje project alone. The mandate of the management team was compromised by the challenges of legitimacy attached to sponsors and therefore low. While management possessed some resources including the day to day management of the ethanol plant, a significant portion of the resources available were dependent upon the facilitator availing these, in particular the land upon which the sugar cane was grown.

Table 8.7: Chisumbanje Prioritisation of Stakeholders

Stakeholder	Level of power or importance	Level of interest		Resources Available	Links	Access	Priority for Engagement
		Urgency	*Mandate*				
Sponsors **(S)**	High	High	Low	Many	Ally with M and G	Good	High
Management **(M)**	High	High	Low	Some	Ally with S and G	Good	High
Contractors **(C)**	Low	Medium	Medium	Few	-	Low	Low
Government/State Institutions **(G)**	High	High	Low	Many	Ally with S and M	Good	High
Community **(CO)**	Low	High	High	Few	-	Low	Low

Key
High priority factor
Medium priority factor
Low priority factor

The management team had strong alliances with both the sponsors and state institutions, and good access to all internal stakeholders by virtue of running the project operations. Overall the management possessed a high priority for engagement. Brazilian sourced contractors played a limited role in Chisumbanje, mainly in the form of installing second hand equipment from Brazil in the setting up of the ethanol plant. Post installation, the use of these contractors was minimal. Their level of power was therefore low. The urgency for the contractors was medium on account of the assignment being a short-term equipment purchase and installation task, with a conservative monetary value attached to it. As an independent third party commissioned by management and with limited interaction with all internal stakeholders the mandate of contractors was medium. Resources available to the contractors were few and focused on the contractual terms to execute the tasks requested, and their technical capacity to undertake these. In addition, there were multiple contractors internationally that had the same technical capacity. No significant alliances were noted between the contractors and other stakeholders, and the access of the contractors was low as they primarily dealt with management in their interactions, and exited after completing the assignment. As a result of the ability to readily replace contractors, and their short and limited engagement in the project construction, a low priority for engagement is accorded. Government and state institutions possessed a high level of importance in Chisumbanje. This was justified by their contribution of ARDA land that was essential to the project, and the role-played by key regulatory agencies including ZERA and EMA in enabling the venture. The level of urgency by state institutions was dependent upon the political incumbents. It was high at the commissioning of the project when Zanu PF was in power, medium during the government of national unity that included the MDC, and high again in 2013 when Zanu PF reverted to being the majority government. The mandate of state institutions was low evidenced by challenges by communities regarding relocation, parliamentary challenges during the government of national unity to the entire project, and widespread public resistance to mandatory blending of ethanol. Government has applied a wide range of resources to Chisumbanje including the leasing of land to the project company, prescribing mandatory blending, issuing an ethanol producing license, effectively exempting the plant from compliance with environmental processes, and deploying law enforcement agencies including the army and police to quell community uprising s against the project. Government institutions also have strong alliances with the management and sponsors of Chisumbanje, and enjoy good access to all internal stakeholders. Government and state institutions thus have a high priority for engagement.

Community organisations including environmental advocates have a low level of importance in Chisumbanje. This is partially due to the fact that the communities directly affected by changes in land usage and location are rural,

with limited education and resources to resist the sponsors assisted by state institutions. The urgency and mandate for community organisations is high as the project has a direct and immediate impact on livelihoods including places of residence, sources of employments and income, and the hospitability of the surrounding environment, for people frequently with extended and strong ancestral and commercial links to the area. The resources available to community organisations are few. In part this is due to the impoverished circumstances of these rural groups. In addition because these communities are sparsely populated, their ability to mobilise and build organisational capacity to protect their interests is compromised. The power of voice through appropriate channels is not effectively used due to this lack of capacity, and resistance is expressed by way of sporadic disturbances against the project company. There were no significant alliances noted between community groups and other internal stakeholders and the access of the community to other stakeholders is low. Consequently, community organisations are rated low for priority engagement on Chisumbanje.

8.2.2 Priority for engagement in the cases

The 7 cases analysed above reveal a number of insights regarding the prioritisation of stakeholders, and the reasons for this. Sponsors and management consistently score a high engagement priority. This can be attributed to shareholders and managers being highly invested in the projects and having committed significant upfront costs including development costs and equity. As a result the shareholder and managers exercise significant influence over each ventures development and make important decisions that inform the project. Sponsors and managers are also in the practice of forming strong alliances as in the case of Seacom, Gautrain, Kalkbult, SNGP, Mozal and Chisumbanje, and often the distinction between sponsors and management is blurred and the two stakeholders are inseparable. Frequently sponsors and management enter into strategic alliances with government institutions making their importance even greater. Sponsors and managers possess extensive resources available to them entrenching their power and internal access to other internal stakeholders.

Contractors possessed medium to high priority for engagement mainly depending on the nature of the contract. Where the contractor had a high level of interest due to the size of the contract as in Seacom, Gautrain, Kalkbult, Mozal, and SNGP, the priority for engagement is high. Where the level of interest is medium or low due to the financial insignificance of the contract as in the PBMR and Chisumbanje, the priority for engagement is low. Importantly the importance of the contractors changed depending on the stage of the contract. Contractors were highly important in the project development and construction phases. If the contractor had no subsequent

operational involvement, the importance of the contractor declined considerably as in Seacom, Kalkbult, Mozal, SNGP, and Chisumbanje. In the Gautrain project the Bombela consortium remained highly important even after construction, as they were the project operator. Contractors generally possessed some resources particularly regarding technical execution of the construction phases of the contract, and in the Gautrain the actual operations of a rapid railway system. Contractors had very few alliances and links with other internal stakeholders and their interactions were to a large part regulated largely by contractual arrangements. They had good access to management and sponsors to facilitate construction, after which access levels generally declined.

Government and related state institutions enjoyed a high priority for engagement in all the cases except for Seacom where this was medium. Seacom was exceptional because the project spanned multiple jurisdictions weakening the importance of individual governments. The high priority for engagement of state institutions can be attributed to two main reasons. Firstly frequently governments are sponsors to the projects and have equity participation in them. This was evident in the Gautrain, PBMR, Chisumbanje, SNGP, and Mozal. Furthermore state institutions made essential contributions in facilitating the projects including foreign exchange risk sterilisation and the patronage agreement in the Gautrain, land lease in Chisumbanje, cable-landing rights in the case of Seacom, and allocations from the national budget and DFIs for the PBMR. Secondly, state institutions played an essential regulatory role including the PPP division of national treasury in vetting and approving the Gautrain that played a significant role in shaping the project. In addition the custodianship over the REIPPP by the DOE including evaluation and selection of successful bidders was highly important for Kalkbult. The liberalisation of the telecommunications sectors impacted on Seacom penetration of targeted markets, while approval for ROMPCO servitudes, the Gas Agreement between South Africa and Mozambique, and limited land displacements enabled the SNGP. The investment protection agreement between Mozambique and South Africa supported both the Mozal and the SNGP diminishing substantially expropriation risk, and Mozal enjoyed tax concessions specifically designed to accommodate the project. In Zimbabwe state institutions issued Chisumbanje with an operating license, by default exempted them from environmental impact checks, and prescribed mandatory blending. These decisions by government institutions were essential to the project's commencement and continuation. Governments of the respective countries had high interest in all the projects because of their potential to have a significant impact on their national economies and social development. State institutions were generally characterised as having some to many resources available to them and were frequently allies with sponsors and

management as detailed earlier, and enjoyed good access to internal stakeholders.

Community organisations including environmental groups were characterised by a low priority for engagement. Primarily this could be attributed to the low to medium level of importance of community organisations. The low level of importance can in part be attributed to community organisations not being involved in the early stages of the project, leaving them at a significant disadvantage in terms of information and being able to shape and influence the project. Community organisations also displayed low to medium levels of active interest. In part this is because projects such as Seacom, Gautrain, PBMR, Mozal, and SNGP were new in the countries in which they were being implemented, and the implications of these ventures had never been directly observed. Community organisations also had few to some resources. For projects such as SNGP, Mozal, and Chisumbanje limited resources could largely be attributed to poor rural, agricultural subsistence communities, who lacked the capacity to mobilise as a collective and build organisational capacity to look after their interest. Community organisations also displayed weak to non-existent links with other stakeholders and had low access to other internal stakeholders, exacerbating their isolation.

An interesting observation from the cases regarding community organisations related to how sponsors in the 7 cases appear to display a preference for alliances with state institutions as opposed to the communities in which the projects are located. This preference by sponsors can be explained by the attraction of alliances with state institutions because of their legally enshrined decision making powers, and extensive domestic and regional networks that allow them to project influence and power. State institutions also have extensive resources including regulatory powers, access to political principals, financing (even if limited), and land, and law enforcement powers including the police and military forces. The state also gave the Gautrain, PBMR, SNGP, and Mozal, high levels of legitimacy. In contract community organisations offer little to sponsor groups and were often characterised as impoverished, unaware of the project implications, and poorly organised. This observation raises two particularly pressing questions. The first is whether large project and infrastructure projects should only be entered into with state representatives as opposed to community organisations, as the latter frequently lack the capacity to negotiate such arrangements? Secondly, where such arrangements are only entered into with state institutions, what measures are required to prevent state institutions that should be representing the interests of communities, colluding with project sponsors and undermining these very community interests? The only project where community groups owned an equity stake was Kalkbult. And the reason for

community equity participation in this case was the prescriptions in the REIPPP.

Monitoring and evaluation

The monitoring and evaluation function in the 7 cases reflects key divergences from the mainstream academic literature on large listed companies. The most significant difference is the limited substantive differentiation between sponsors and management in all the projects with the exception of the PBMR. In 6 of the projects the executive management team was essentially constituted of employees seconded from the sponsor organisations, who had been extensively involved in the project from conception, to construction and operationalization. In deploying them to the project company in the operational stages, sponsors not only sought continuity, but also ensured they had direct control over executive management, and were not implementing monitoring and evaluation through indirect personnel and instruments. To a significant degree this conflation of sponsors and management reduced agency cost risks, and was a more effective and efficient monitoring mechanism. As opposed to listed company arrangements where shareholder and management goal congruence is an important challenge requiring the implementation of extensive interest alignment mechanisms and monitoring, management and sponsors in 6 of the cases were in a closely knit alliance, and frequently holding both roles. This reduced significantly monitoring and evaluations costs incurred, and facilitated a greater alignment of strategy and execution between sponsors and managers. This arrangement was enabled by the fact that the project sponsors had significant technical and operational skills required in each project's operational management within their own organisations. It was also necessitated by the fact that sponsors had committed significant resources to the projects and would have been unwilling to risk a traditional arms length shareholder/ manager arrangement typified in listed companies.

In the case of the Gautrain, whilst a semi-autonomous management institution in the form of the GMA was established, this was appropriate due to the complexity of the project, including the extensive number of contractors, and the fact that the Bombela consortium required extensive on-going monitoring over the concession period, as it managed the operating company. The GMA was in a strong and close alliance with the provincial government, exemplified by the fact that it was registered as a provincial entity whose mandate was to look after the interests of the provincial government, and that it was ultimately accountable to the latter. The significant monitoring and evaluation costs incurred in maintaining the GMA are justified by the significant monetary investment in the project by the sponsors, the importance of qualitative

metrics such as train punctuality and reliability, and the significant public interest in the project's performance and success.

The PBMR was also established as a semi-autonomous entity but suffered substantial deficiencies in the monitoring and evaluation mechanisms. This can be attributed to multiple reasons including that the implementation of monitoring and evaluation systems began to be implemented well into the project's life in 2004, whereas the project had commenced in the later 1990s. Management also had great difficulty in effectively monitoring and evaluation progress on the project due to its technical and scientific nature, whereas executive management was largely possessed of commercial skills. In contrast to all the other cases, the sponsors in the PBMR were very limited in their direct involvement in the project. In part this was due to the multiple reporting lines between Eskom and various government departments, and also because key officials in Eskom and government departments, actively sought to distance themselves from the project. As observed in the individual cases, in all the projects extensive use was made of performance based contracts and turnkey contracts and related bonding mechanisms. These were rigorously monitored and managed by the project companies, and in the case of the Gautrain, within the GMA.

Crafting responses

The manner in which sponsors and management crafted and shaped the project arrangements to address the different stakeholder interests is largely captured in each case under the financial structure, key risks, and institutional and legal arrangements sections. It is instructive however to note the responses of project principals to challenges that arose in the projects. The Seacom project encountered formidable challenges in securing landing points in the chosen countries. Practitioners addressed this resistance by highlighting the benefits that would accrue to the respective countries, and also actively ensuring political principals shared in the credit on the positive and social effects of the venture. On-going engagement with policy makers and purposeful, deliberate and well-orchestrated advocacy were key aspects of managerial responses. Where these engagements were unsuccessful, project managers sought to circumvent obstructionist countries by using alternate routes that would still ultimately allow them to reach and service target markets, failing which co-operation agreements with incumbent competitors with back haul infrastructure were pursued.

The GMA encountered extensive criticism of the Gautrain from the general public and community organisations especially during to the highly disruptive construction phase. Management's response was to craft a highly responsive and engaged marketing and public relations capability. This function communicated to stakeholders each stage of the project, where disruptions

were occurring due to construction activities, and responded (though not necessarily resolved) public complaints and grievances across multiple media platforms including social media. Regarding court challenges to the Gautrain's route and its environmental implications, management addressed the law suits by demonstrating compliance with all necessary laws and regulations, and winning every case. When the operations of the Gautrain were disrupted by copper cable thefts and industrial action management ensured the public was well informed through its communications strategy. In addition, these operational risks had been delegated to the Bombela consortium that were highly incentivised to resolve them in a timely manner as the contractual arrangements had significant penalties disruptions. Disputes between the sponsors of the Gautrain and the Bombela consortium have been generally resolved internally, with the exception of a water ingress dispute that was finally resolved by arbitration in the province's favour.

Despite limited initial resistance to the PBMR from environmental organisations, this increased throughout the project's life. Whist it was difficult to address "in principal objections to nuclear energy", management actively sought to address other objections. Regarding the risks associated with extending the physical footprint of nuclear facilities in South Africa, the prototype for the PBMR was envisaged to be built within the vicinity of the Koeberg nuclear power plant precinct. Management also actively engaged with environmental groups and exchanged information and data with them. The thinking in this regard was that whilst there was a very low probability of reconciling the demands of environmental groups and the project objectives, the project would benefit from the additional layer of monitoring that these groups performed.

No significant resistance or conflicts to the Kalkbult project were observed. However management have embedded on-going interactions with community representatives via the community trust and women's group. In both the Mozal and SNGP ventures formalised channels to address community grievances have been utilised successfully. Regarding operational challenges to the projects in their construction and operational stages extensive use of government channels has been made, justifying the strategic alliances with state institutions. The Chisumbanje project has been characterised by dysfunctional community engagement processes that have resulted in sporadic community protests targeting and threatening the ethanol plant. Despite managerial insistence of engagement with affected communities, these processes have been unsuccessful in large part possibly because the project mandate and legitimacy is questionable with surrounding residents. The result of this acrimonious environment has been the deployment of law enforcement agencies in the form of the police and military forces by government to the area. The entry of law enforcement agencies into this

contested project is extremely controversial, as government is perceived to be an effective sponsor of the venture, and thus conflicted in its use of public resources.

Impact on operational performance

The impact on operational performance of stakeholder disagreements in Seacom has manifested in the form of challenges in developing back haul networks in certain countries, restricting access to end users. Delays in laying the cable through Egypt during the construction phase resulted in unplanned incremental costs of approximately US$ 60 million. For the Kalkbult, SNGP, and Mozal there were no notable stakeholder conflicts experienced that could not be resolved and resulted in a significant impact in each of these projects operations. The prototype for the PBMR was never constructed and the venture not commercially operationalized rendering redundant the question on the impact on operational performance. Finally the Chisumbanje plant has been characterised by significant operational disruptions. The plant was mothballed from 2008 to 2013 during the rule of the government of national unity, owing to a lack of a number of regulatory approvals. There have been sporadic outbreaks of community protests against the ethanol plant and acts of sabotage directed towards it. Chisumbanje remains a highly contentious venture with characterised by widespread public disapproval and contestations regarding its legitimacy.

8.2.3 Understanding institutional fragility

An important observation in the cases studied is the role of formal and informal state institutions as stakeholders, and in enabling or frustrating project progression. Coupled to this is the important recognition highlighted in the introduction to this chapter of the political, social and economic dynamics that are playing out in South Africa, Mozambique, and Zimbabwe. The respective governments are pursuing what can be broadly described as a wholesale transformation project to address the relatively recent legacies of colonialism and apartheid that result in these three countries being characterised by higher degrees of uncertainty, complexity, extreme inequality, and poverty. This situation frequently results in fierce contestation between different stakeholders, and state institutions become key points of engagement. This section will begin by briefly describing the role of state institutions centrality to the transformation project that the three countries above are seeking to pursue. It will introduce the concept of a “confident state”, which describes how the government’s posture towards state institutions based on its internal and external confidence. Finally it will apply these insights to the actions and behaviours of formal and informal state institutions in the case studies.

A confident state in may be defined, as a government that believes that its policy objectives enshrined through various policies and institutions, will not be subverted by either internal or external actors. An internally confident state has the sense that the political environment is stable and coherent, and the legitimate power of the state will not be unsurped through illegal or subversive processes. This implies a maturing political system, where the rule of law fundamentally functions, and majority rule is not frustrated by powerful and narrow vested interest. Majority rule is further not inconsistent with constitutionalism and the protection of minority and investor rights. An externally confident state is secure that the international political dynamic is neither intrusive nor obstructionist, and respects the sovereignty and legitimate power of the incumbent government. This implies other countries, particularly from beyond the Sub-Saharan Africa region, will not interfere in the domestic affairs of the host country. Such perceived interference may be in the form of overtly taking sides with contesting political parties, and providing foreign financial funding and related resources to non-governmental organisations and other civil society actors that are in opposition to the incumbent government. External interference of this nature has the effect of intensifying political contestation with incumbent governments fearful that their legitimate authority may be unsurped by externally funded stakeholders, in order to defend the status quo, or advance other agendas not in the national interest. Whether the threat is perceived to be internal or external, where the incumbent government loses its sense of confidence, there is a perceived existential threat to the ruling party and the country's emerging democracy. The incumbent government may become defensive and reactionary, justifying the suspension of the rule of law, negating or ignoring institutional rulings, violating minority rights, and expropriating assets in the name of national survival.

Confidence in state institutions is an essential requirement of governments as when legitimate and effective institutions are in place, political principals can willingly cede powers to other actors and individuals through these institutions. These institutions have the potential to impact significantly on the incumbent government's political project, and while strongly influenced by government through policy frameworks, political principals may not have direct control over the institutional workings. To be confident in these institutions, incumbent governments require them to be sympathetic to the overall transformation project. These institutions are frequently led by individuals who made a significant contribution to the liberation effort, and can implicitly be trusted to make decisions that do not subvert the transformation agenda, but rather add impetus to it. Where the government/political principals are not confident in these institutions, this may result in them being undermined by government actors because political principals feel vulnerable. Politically in South Africa this manifests as ANC fears of the influence of the

Democratic Alliance, which is the official opposition and has close ties to the corporate sector, in Mozambique Frelimo fears the influence of Renamo, and in Zimbabwe Zanu PF is concerned about the influence of the MDC. State institutions can become arenas of contestation because they determine to whom state financial resources flow, the officials leading these institutions apply executive powers, and these decisions can alter the balance of forces amongst the contesting stakeholders. This narrative has been and continues to be a compelling force in the evolution of state institutions across the political and economic spectrum in Southern Africa, and has a direct bearing on project and infrastructure finance ventures that are regulated by these institutions.

In the SNGP and Mozal, it is instructive that the committees/forums set up to enable the execution of these projects were not formally institutionalised. Formal institutionalisation would likely have included autonomous or semi-autonomous public institutions with the capacity and authority to service existing and prospective and new projects. This lack of formal institutionalisation was not an oversight but intentional. An informal apparatus allows political principals to more easily place trusted collaborators into key positions of influence, and where necessary to remove them. This lack of formalisation emphasises personal relationships and access to individuals to enable projects, in contrast to ceding these powers to a dedicated institution. A similar situation is observed in South Africa where proposals have been made that the Independent Power Producers (IPP) Unit currently a unit in the DOE be established as a separate government authority with an explicit and focused mandate to procure energy from private sector bidders. The IPP Unit remains under the DOE and reporting into the respective cabinet minister, with strong political resistance to its semi-autonomous institutionalisation.

In Zimbabwe, the contestation surrounding the legitimacy of the Chisumbanje project has resulted in ZERA, EMA, ARDA, and even parliament becoming arenas of political contestation stemming from the project. Firstly during the government of national unity from 2008 to 2013, the Chisumbanje project was mothballed as regulatory approvals from state institutions could not be obtained due to contestation on the project between Zanu PF and the MDC. Subsequent to Zanu PFs ascendancy after the 2013 elections, ZERA issued an ethanol production license despite conceding that it had failed to achieve full regulatory oversight over Green Fuel. This was subsequently followed by the introduction of mandatory blending in the country, with Green Fuel as the sole supplier, despite massive public resistance, and questionable economic justifications. As highlighted EMA failed to process the EIA of Green Fuel, resulting in it obtaining regulatory approval by default. The utilisation of ARDA land and the impact of this on surrounding communities is another area of

state institutions being questioned regarding the legitimacy of their actions to the national interest as opposed to partisan political interests.

The consequence of a low confidence in the state may result in political principals attacking and undermining state institutions that they perceive to be obstructionist to the transformation project. This may result in institutional paralysis due to political gridlock, institutions lacking clear and explicit mandates, unfunded institutions, and political appointees to institutions that require technocratic leadership. Incumbent governments effectively undercut their own policy positions, pronouncements, and the authority and power of mandated institutions. Non-institutionalisation of forums and committees makes it difficult to develop and build institutional memory, that can be used when prospective projects are under consideration, and may result in erratic choices and decision making, as these are driven by the individual committee incumbents and not an overarching policy and institutional framework.

The factors leading to institutional fragility above can be in part addressed by the following measures. Within the country, leaders from the key societal stakeholder groups should endeavour to reach an accord committing to resolving contested areas internally, and disavow external intervention, support and funding. Fidelity to this principal would also limit the extent to which incumbent governments can blame external parties for domestic challenges. This principal is especially important for minority groups and corporations, as they are highly vulnerable to being used as scapegoats by a government that perceives itself to be facing an internal or external existential threat.

For external governments such as the USA and the UK, and organisations such as the EU, a reassessment of policy responses under such stressed circumstances is recommended. Applying targeted sanctions on political principals, suspending access to financial resources disbursed by the World Bank/IFC and IMF, and cutting off access to the global financial system ratchets up the perceived external threat, and diminishes the external confidence of the incumbent government. This provokes an extreme reprisal that can only be effected if domestic institutions are further undermined, resulting in self-fulfilling downward cycle of events. To avoid such disruptive developments and ruptures in international relations, influential countries such as the USA and UK may need to be more astute regarding sensitivities based on the colonial and apartheid experience. The sponsorship of political organisations and politically inclined non-governmental organisations is likely to result in diplomatic confrontations. Similarly, while disagreements between governments are inevitable, expressing arguments and invectives in the mainstream media is counterproductive, and diplomatic channels would likely be more effective. Where deep differences do occur, the involvement of

regional organisations such as SADC to act as facilitators for conflict resolution adds legitimacy and credibility to the process. This was the case with Zimbabwe where the governments of Botswana and Zambia, amongst others, challenged the socio-economic effects of the fast track land reform program that removed commercial farmers.

In summary the governments of South Africa, Mozambique and Zimbabwe continue to have internal and external confidence concerns. Project finance practitioners, sponsoring banks, and external participants need to be aware of these challenges, and their potential impact on institutions regulating their ventures.

8.3 Conclusion on stakeholder agency dynamics

This chapter applied the principals enshrined in stakeholder agency theory I haven't seen much theory to determine how stakeholders are prioritised. A matrix incorporating the key determinants influencing stakeholder interactions was compiled for each case. The matrix concluded with a determination as to whether the applicable stakeholder would have a high, medium, or low priority for engagement by the management of the project company. In arriving at this conclusion, the factors that informed a stakeholder's prioritisation were considered, and how differentials in power, resources, mandate, and access affected shareholder interactions. Based on the results of the examination, reasons were extracted as to why sponsors, management, and government institutions enjoy high engagement priorities, in contrast to contractors and community organisations that enjoy medium to low engagement priorities. The importance of state institutions, which emerged as important stakeholders requiring high prioritisation in engagement, was explored, including why state institutions are frequently arenas of contestation in South Africa, Mozambique and Zimbabwe.

9 Summary and Conclusions

9.1 Introduction

The focus of this study has been on exploring contextual considerations that impact project and infrastructure execution in South Africa, Mozambique and Zimbabwe, and determining their impact on the capital structure and stakeholder arrangements in the underlying projects. Using 7 case studies in the energy, transportation, telecommunications, agriculture and industrial processing sectors, the study is constructed to achieve three objectives. Firstly to determine important contextual considerations that influence the execution of project and infrastructure finance in the three countries of focus. Secondly to investigate what the main determinants of capital structure and financing behaviour for project finance ventures are, and to what degree assumptions in the mainstream static trade-off and pecking order theories, the explanatory powers of these theories, and the limited academic literature on project finance, is applicable to project finance ventures in the three countries. And thirdly, to investigate the interactions between important stakeholders that participate in project finance transactions and determine how stakeholders interactions are managed, power is distributed, engagements prioritised, and broader community and societal interests integrated. The 7 case studies were all commissioned between 1994 and 2014, and 40 interviews were conducted with practitioners to extract qualitative insights as to what informed practitioner decisions in project execution.

This chapter aims to present the main conclusions and discuss some of their possible implications for financial, state, and corporate policies. In addition, limitations to the study will be discussed. The chapter ends with suggestions for future research. The chapter is structured as follows. Section 9.2 provides a summary of the main findings of the study and some of the potential implications. Section 9.3 lays out the limitations of the study. And finally section 9.4 makes recommendations for further research.

9.2 Findings and implications

Findings on contextual factors

The first contribution of the thesis was to collate important contextual and structural factors that shaped the 7 cases investigated. These were expressed in a model that enables a clearer perspective of key contextual and structural factors impacting on how projects are executed in the three countries. The NPIF model proposed offers a lens through which project and infrastructure ventures executed in Sub-Saharan Africa can be viewed more holistically. The model builds on the observations of the case studies that highlight that the

contextual environment differs markedly from many part of the world including higher degrees of uncertainty, elevated levels of complexity, greater inequality and poverty, and a higher imperative for business inclusiveness. The NPIF model is useful in understanding the macro-environment impacting on project finance transactions, proactive measures to address potential challenges and hurdles.

Findings on capital structure

The first finding regarding capital structure is that the assumptions underpinning the main capital structure theories appear to have very limited applicability to capital structure formulation in project and infrastructure finance on the 7 case studies against which they have been examined. These assumptions include the existence of perfect capital markets, no transaction costs, symmetry of information, the absence of bankruptcy costs, benefits of debt as a tax shield, debt as a disciplinary tool, and minimising monitoring and bonding costs. The 7 cases revealed that capital supply constraint considerations were arguably the most important determinant of leverage. This disjuncture from the main capital structure theories in part arises from the fact that the latter were crafted and expanded upon in developed markets, making their applicability to transitional economies questionable, and to project finance in the South Africa, Mozambique and Zimbabwe tenuous. Implicit from this finding is that the predictive and explanatory capability of these theories for project finance transactions in Sub-Saharan Africa is doubtful.

The second finding leading from the earlier one above of the thesis observed a disjuncture between theory and practice in the formulation of capital structure. While the mainstream capital structure theories emphasise tax-based considerations, practitioners emphasised very different factors. Priory factors for practitioners were access to capital (ability to raise and source capital), derisking of projects to be able to source capital, the capacity of capital contributions by equity participants, government and state institution facilitation, and other factors that were combined including political risk, bonding contractors, and regulatory prescriptions. Access to capital and derisking of projects emerged as the two most important determinants of capital structure. As a result leverage is significantly lower than the approximately 70% anticipated in project finance academic literature. This finding is significant in understanding how capital structure is actually arrived at in practice in project finance transactions in the Sub-Saharan region, and what the most highly placed considerations are. It further extends our understanding of capital structure formulation in developing markets. The findings suggest that agency theory is a superior predictor and offers a more

accurate explanatory model of capital structure determination than the mainstream capital structure theories.

The third finding discounted the importance of shareholder and manager agency cost considerations in the determination of capital structure in the mainstream capital structure theories. The thesis found sponsor/manager agency costs to be substantially addressed by a conflation of personnel in the sponsor consortium and executive management team of the project company, and the formations of strong alliances between sponsors and management. These mechanisms reduced the use of debt as disciplinary tool, monitoring costs, and information asymmetry, in project and infrastructure transactions. In summary capital structure formulation is an outcome of an ecosystem that encompasses the project and the context in which it is undertaken. This ecosystem changes and evolves, and as a result requires responsiveness in capital structure decision making, as opposed to inflexible and mathematically driven theoretical approaches.

These findings prescribe a focus on access to capital and derisking projects to attract greater investment capital into project finance. Regarding accessing more capital potential interventions include a more purposeful initiative to attract private equity as a source of project finance capital. While private equity was utilised to a limited extent, the prevalence of dedicated infrastructure funds and similar vehicles in Europe and North America, indicates this to be a potential source of significant project capital. Project practitioners may be able to replicate the Seacom process of raising capital upfront by selling project capacity or outputs. This has high potential applicability to lower risk projects with predictable revenue streams such as the Kalkbult project and those in the REIPPP. The high priority of derisking a project suggests a greater emphasis on brownfield ventures, as these would face lower barriers to reaching financial close. Greater domestic capital could be attracted to project finance by designing and distributing retail investment instruments that enable lower investment amounts, and tapping into non-institutional capital providers. The latter measure could also reduce the reliance of projects on dollar denominated capital that exposes them to foreign exchange risk. Debt issuances could have a blended component of dollar and local currency funding, with domestic currency increasing over time as capital markets develop. Related tariffs could then also be structured to reflect the weightings of the currencies proportions. The cases and findings also demonstrated the importance of non-monetary capital in the form of land and other endowments to inject equity capital into a project. Non-monetary equity contributions can play an important role in capitalising projects in Southern Africa due to extensive non-monetary resources being underexploited.

Measures that can be implemented to derisk capital providers investment exposure is for project developers to offer capital subscription options that address the different risk appetites and parameters of potential funders. This extends beyond notions of traditional equity, mezzanine finance, working capital facilities etc. The costs of hedging against foreign exchange and currency repatriation risk can be reduced if dedicated wholesale markets on a national or regional basis are established. Establishing such facilities that can be accessed by infrastructure practitioners in the project conceptualisation stage, and the receipt of a commitment equivalent to a term sheet, could contribute to much more favourable capital structure arrangements. Finally the facilitation activities conducted by small and medium sized countries may be more efficiently performed if housed in a single multilateral organisation that could extract economies of scale.

Findings on stakeholder dynamics

The first finding on stakeholder dynamics was to understand the reasons why government and state institutions play an inordinately large role in the 7 cases, and the strategic alliances between sponsors and state institutions that characterise 6 of the 7 projects. In addition to the importance of state institutions as contributors of monetary and non-monetary equity, regulatory power, and other facilitation, governments were observed as having high importance and wielding a wide range of resources. Consequently in conjunction with the sponsor/manager alliance state institutions are the most significant contributor to project progression. The attraction arising from the states array of resources results in project sponsors and managers preferring to execute ventures in alliances with the state, as opposed to local communities. These alliances have the potential to result in predatory actions against communities, environmental breaches, and other socially regressive outcomes, because community organisations are poorly organised, lack resources, are of low importance, and consequently a low priority for engagement. The implications arising from the findings of the stakeholder dynamics suggest more robust measures to protect the interests of community and environmental organisations due to their limited resources, and vulnerability to project sponsors, managers, and state institutions. In addition project practitioners need to factor into their risk mitigators the contestation that occurs in state institutions, as this can cause major project disruption.

Overall contribution to portfolio of project finance case studies

This thesis makes a significant contribution to the number, depth, and quality of case studies on infrastructure and project finance in Sub-Saharan Africa. The literature review yielded only two case studies of an acceptable standard both concluded in the 1990s. These two cases were drafted by an offsite

North American researcher. This paper adds seven more cases to the number of project and infrastructure case studies drafted in Africa. Further this thesis modernises and brings up to date the literature on project finance on the continent by incorporating cases that became operational as recently as 2013. Having been drafted by an African researcher with access to key project finance practitioners and extensive commercial exposure to the SADC region, it is submitted that this work is more deeply rooted and relevant to the actual reality in Southern Africa, including documenting more accurately the motives and thoughts of the various actors party to these ventures who were interviewed.

Previous case studies in Southern Africa have made very limited reference to the stakeholder and sustainability implications that accompany large-scale projects. Each of the case studies conducted makes an assessment and analysis of the stakeholder and sustainability implications of the case. As a result proposals for embedding greater sustainability into future project finance ventures have been made that can be replicated in central, eastern and western parts of the continent. These proposals differ from generic interventions in western countries due to divergent contextual settings unique to South Africa, Mozambique and Zimbabwe.

9.3 Limitations of the study

The study was characterised by several limitations. The first of these is the fact that the case studies conducted related to only three countries in Sub-Saharan Africa. No case studies were performed covering West Africa, East Africa, or Central Africa. As a result the research output is primarily applicable to the three designated countries limiting the external validity of the findings beyond South Africa, Mozambique, and Zimbabwe. On account of the fact that in combination these three countries reflect the varying socio-economic and political conditions of many countries in Sub-Saharan Africa, the findings can be applied to the broader continent only by inference. The second limitation relates to the fact that the case studies selected all span a period post 1994. This limitation is due to the limited number of project and infrastructure finance transactions in the selected countries due to largely political constraints such as international isolation, economic sanctions and civil war. A third limitation relates to the researcher not being permitted access to certain transaction documentation that was not in the public domain and which the sponsors deemed confidential due to proprietary and other competitiveness concerns. While this was generally supplemented from alternative sources, some key data points may have been omitted on account of this limited access. Further, as respondents participated in the semi-structured interviews on a voluntary basis, they may have withheld information that they believed to be proprietary in nature in response to the interview

questions. The final limitation relates to the respondent profiles. While the study interviewed a range of different and independent respondents for each case, the constraint of time and resources meant the most well placed respondents were selected and interviewed, with less well placed respondents who would contribute less insight were purposefully omitted. The final limitation relates to a potential bias on the part of the researcher. By doing detailed investigations and write ups of each projects prior to the semi-structured interviews the researcher may have unknowingly adopted certain biases in the questions posed and how they were posed. It is submitted that this potential limitation is far outweighed by the value derived from the qualitative questions posed as a result of having a thorough knowledge of the underlying cases.

9.4 Recommendations for further research

Extended research in Sub-Saharan Africa

The most pressing recommendation in further studies is for researchers to conduct similar case studies in other countries in Sub-Saharan Africa beyond Southern Africa. In addition to the core areas of capital structure, governance, risk management, and sustainability upon which this thesis was premised, further study could add on the role of capital markets, and the institutional arrangements that impact on selected jurisdictions. Specifically these should cover East Africa, West Africa, and Central Africa encompassing key economic communities and hubs. Research papers in this respect could be framed as follows:

- An investigation into the qualitative characteristics of large infrastructure and project finance ventures in the East African Community between 1980 and 2015.

Alternatively the above research could be formulated based on the six pillars that have arisen from the NPIF model. Research papers in this respect would be framed as follows:

- An enquiry into the qualitative characteristics of large infrastructure and project finance ventures in the Economic Community of West African States between 1980 and 2015 using the six pillars of the ‘Normative Project and Infrastructure Finance’ model.

This larger geographical footprint would facilitate the capturing of specific country nuances including Francophone and Lusophone countries and legal systems, and divergent political and sovereign risk considerations.

Capital markets and project and infrastructure finance

Noting the critical role of developed capital markets in project and infrastructure finance, additional research is required to econometrically model how capital markets contribute to infrastructure formation. Research papers in this respect could be framed as follows:

- Developing an econometric model calculating the restraining effect of under developed capital markets to the commissioning of large-scale project and commercial infrastructure ventures: An Assessment of Nigeria.

- Developing an econometric model calculating the restraining effect of under developed capital markets to the commissioning of large scale project and commercial infrastructure ventures, and the concomitant effect on economic development: An Assessment of Mozambique.

- Prospects for an alternative project funding model using infrastructure bonds in South Africa.

Longitudinal research

Further research is also required on projects commencing early on in the conceptual stage through to commercialisation. This is particularly relevant as research on projects typically occur at a set point in time. Earlier events may be diluted as institutional memory erodes due to personnel departures, while future events understandably cannot be incorporated. Longitudinal research of this nature will give a more accurate, nuanced and pointed view and assessment on how project and infrastructure finance transactions evolve from concept to reality, and also the challenges that are encountered and how these are overcome. Such research could be done in stages by multiple researchers over a number of decades and could culminate in rich and detailed project insight. By way of example using the Gautrain research in this respect could be framed as follows:

- A longitudinal study of the Gautrain capital structure, governance arrangements, risk management and sustainability imperatives from conceptualisation, feasibility, commissioning, operations, and expansion between 1995 and 2025: A paper illuminating how projects unfold in the dynamic socio-economic and political context of South Africa.

Reaching financial close

Another area of potential research would be to investigate projects that reach an advanced conceptual stage yet fail to reach financial closure and the reasons for these early miscarriages. Research of this nature could be

conducted with the co-operation of DFIs and commercial banks that vet projects applying for funding and have databases that can be interrogated in this respect. Such research could be framed as follows:

- An investigation into the reasons and differentiating characteristics between project finance ventures that reach financial closure and commissioning, and projects that fail to reach financial closure: A South Africa Analysis from 1994 to 2015.

Politically sensitive state projects

A fifth recommendation is research on politically sensitive projects such as the Medupi Power Station and the Sanral E Tolls that would be extremely difficult if not impossible to conduct currently as input from key officials and institutions may not be forthcoming. Research on these two projects could be frames as follows:

An enquiry into the construction, engineering, financial and political challenges in the commissioning of Medupi Power Station. Mistakes made and lessons learnt. Such research could be framed as follows:

- Establishing the practicality and viability of applying the 'user pay principle' in funding urban highways in South Africa: A Case Study of the Sanral E Tolling Project in Gauteng.

- An investigation into the impact on national budgets where state resources are required to underwrite infrastructure projects: Implications of expenditure on the PBMR and Gautrain on South African fiscal allocations between 1995 and 2015.

Econometric modelling of project finance

The sixth recommendation for research is a comparison of the key metrics in project finance and infrastructure transactions across major geographies. Specifically this research would interrogate a database of project finance transactions over a period of time comparing Africa, with Asia, Europe, North America, and South America. The key metrics would include the debt pricing, debt to equity ratios, currency denomination, sectoral spread, insurance characteristics, facilitation measures by sponsors, the legal system underpinning the transaction, the level of participation of international and regional development finance institutions, and the participation of international developers. The latter would give valuable insight on an international basis as to the differentiating characteristics of project and infrastructure finance globally, and if performed over an extended period of time e.g. 30 years, could

highlight how these transactions have evolved over time. This research could be framed as follows:

- A comparison of project finance between Sub-Saharan Africa, Asia, Europe, North America, and South America.

The effective implementation of sustainability principles

The seventh recommendation for research relates to sustainability provisions in project and infrastructure finance and how these can be more rigorously applied. This research could include an enquiry as to the efficacy of the existing mechanisms to encourage and enforce sustainability initiatives, together with potential new interventions. The research could be framed as follows:

- Determining the driving forces between project developers practicing sound sustainability practices versus project developers breaching sustainability prescriptions: A review of four case studies in Mozambique.

- Addressing imbalanced power relations between project developers and local communities in Zimbabwe: Interventions for more equitable negotiation terms and contractual arrangements.

- The consequences of divergent sustainability laws and regulations in Southern Africa on corporate compliance with sustainability provisions.

The role of national, provincial and local government in infrastructure development: practice vs. theory

The eighth and final recommendation for research is an enquiry as to the role of different spheres of government, namely national, provincial/state, and municipal in enabling infrastructure commissioning and investment. This research could include the interaction between the different spheres required to enable investment, the financial resources available to each sphere, and the types of investment more optimally executed by each sphere.

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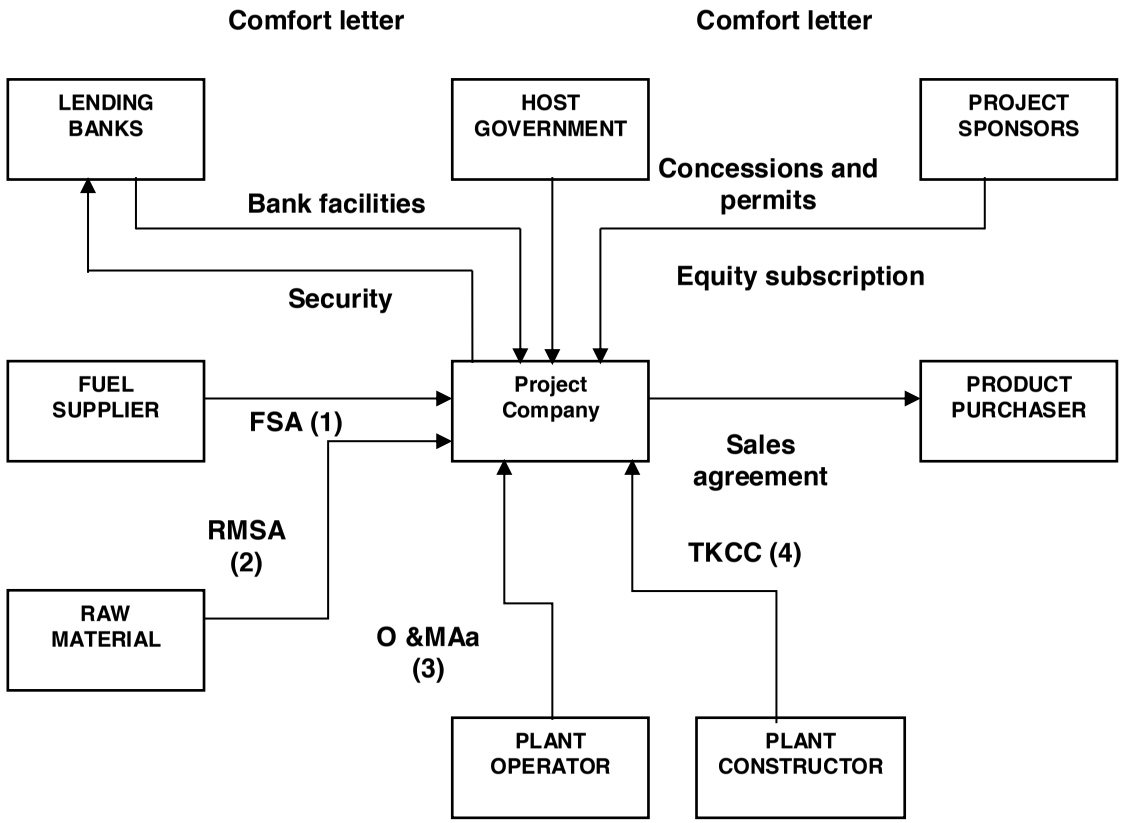
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APPENDICES

Appendix A-1.1: Typical Contract Structure of a Project Finance Deal (Gatti, 2008)

{(1) fuel supply agreement; (2) raw material supply agreement; (3) operating and maintenance agreement; (4) turnkey construction contract}



Appendix A-1.2: Risk Reflections in a Project Finance Deal (Farrel, 2003)

