



Working Paper 7/2015

Regional Industrialization Research project: Case study on Transport infrastructure value chain in South Africa and Mozambique¹

Basani Baloyi and Tatenda Zengeni

bbasibal@yahoo.co.uk; tzengeni@uj.ac.za

July 2015

Abstract

This paper evaluates the development of local and regional industrial development in the context of rail infrastructure projects taking place in Mozambique's Moatize coal fields linked to the discovery of coal deposits in the area. The study used a case approach to analyse the transport infrastructure developments associated with the exploitation of coal resources in Moatize. The study describes the transport infrastructure developments in terms of the main activities involved and the arrangements including the lead firms, the state actors, and the policy framework. The direct linkages to the local and regional economies are critically assessed including understanding how the investments have been organized. We assess the institutional dynamics in terms of the lead firms, the role of the Mozambique state, and influence of other organisations such as the World Bank. The study further assesses the relationship of the infrastructure investments with the development of capabilities at the local, national and regional level. The paper evaluates to what extent are local (Mozambique) and regional (South Africa) linkages being developed given competitive and procurement dynamics. The study provides recommendations on local and regional capabilities development drawing from the findings, including key elements of a regional strategy for maximising the backward linkages of major infrastructure projects.

JEL classification: O14, L22, L74

¹ 1 This paper was done as part of a project on regional value chains funded by TIPS (www.tips.org.za). The views are those of the authors alone.

Table of Contents

1. Introduction	5
2. The Construction Value Chain.....	7
2.1 The particular nature of construction	7
3. Mapping the regional rail infrastructure development: a case of Mozambique and South Africa	15
3.1 Mozambique: Overview of Coal Developments and Transport Infrastructure	16
3.2 Mapping transport infrastructure projects and activity in Mozambique- The case of Moatize	21
3.3 Description of Basic Rail Infrastructure and Main Inputs.....	24
4. Case study of Moatize	28
4.1 Construction activities cost breakdown	28
4.2 Existing and potential capabilities in South Africa and Mozambique	30
5. Mozambique Infrastructure Procurement and Linkage Development Related Policy and Practice.....	32
5.1 Public Policy and Policy Actors in Linkage Development in Mozambique's Construction Sector	32
5.2 Donor funded Public Infrastructure Projects: The Case of, European Investment Bank and World Bank Sena Rail Corridor	36
5.3 Public and Private Sector Procurement Policies and Practices in Tendering and Linkage Development	38
5.4 Investment Promotion and Linkage Development	41
6. The structure of Mozambique's Construction Value Chain	44
6.1 Structure of Mozambique's Civil Construction Sector	45
6.2 Regional vs Global Responsiveness to Mozambique's rail infrastructure demands: A Case of South Africa, Chinese, Portuguese and Italian firms	49
6.3 Mozambique's Local Civil Construction Capabilities and Responsiveness to rail infrastructure demands	56
6.4 Linkage development: Mozambique's experiences from Mozal Project.....	58
7. Critical Review of South Africa's Rail Linkage Development Policy – Lessons for Mozambique?.....	60
7.1 Outcomes of Rail Linkage Development	61
8. Conclusion and Recommendations	66
References:.....	71
Appendix 1	73
Appendix 2	73

Appendix 3: Interview list South Africa	75
Appendix 4: Interview list Mozambique.....	76

Table of Figures

Figure 1: Construction industry value chain	8
Figure 2: FDI inflows to selected African Countries	15
Figure 3: Mozambique Capital flows by Sector, 2009 and 2010	15
Figure 4: Map of Mozambique	18
Figure 5: Comparison of sources of finance for infrastructure in Mozambique and Low Income Countries.....	19
Figure 6: Rail Projects	22
Figure 7: Rail Track Structure technology.....	25
Figure 8: Schematic of a short railway line	25
Figure 9: Inputs into Rail Track Infrastructure	26
Figure 10: Cost Breakdown of Typical Light Railway Line	27
Figure 11: Annualised Compound Growth Rate of Construction Value Added, by Country and period.....	47
Figure 12: Interviewed Firms Characteristics.....	48
Figure 13: Sectors directly and indirectly supply the state	62
Figure 14: Existing and Newly Established Capabilities.....	65

Table of Tables

Table 1: Construction Process Capabilities	10
Table 2: Sources of Finance of Africa's Infrastructure Sector, USD billion	12
Table 3: List of current extractives megaprojects in Mozambique.....	17
Table 4: List of Mozambique potential megaprojects.....	17
Table 5: Performance of Concessionaires in Mozambique's Nacala, Beira and Zambezi Corridor Transport Infrastructure.....	20
Table 6: Mining Company Transport Infrastructure Strategies, 2013	20
Table 7: Nacala railway line Cost breakdown.	29
Table 8: Cost breakdown for Nacala Coal Terminal.....	29
Table 9: Capabilities in Mozambique and South Africa for rail and related construction.....	31
Table 10: Description of Tender Modalities	33
Table 11: Description of Tender Process and Institutional Involvement and Role	34
Table 12: Parameters considered and the points awarded for consulting services ..	35
Table 13: Quality Evaluation.....	37
Table 14: Factors considered by World Bank when awarding contracts from 1 (not important) to 5 very important.....	38
Table 15: Nacala Corridor - Equity Distribution.....	39
Table 16: Institutions responsible for investment promotion and linkage development	43
Table 17: Classification of construction companies and minimum capital requirement.....	45
Table 18: Companies operating in construction of the Nacala and Sena lines.....	49
Table 19: Clients in South Africa and Mozambique According to Firms.....	51
Table 20: Strategies Used to Facilitate Market Entry in Mozambique	52
Table 21: Linkage Development Tools	60

1. Introduction

There is widespread agreement that massive investment in infrastructure is required to achieve higher rates of growth and development in African countries. This is in the context of very low investment rates in the 1980s and 1990s and a substantial backlog. There are important debates about how infrastructure should be financed and which economic sectors and interests should be prioritised. This report sets out the context of the transport infrastructure value chain in Mozambique and South Africa, focused on the massive coal developments in the Moatize area.

Exploitation of mineral resources is one of the main reasons for very large transport infrastructure projects. Production of minerals and agricultural commodities has been at the base of the relatively rapid growth that Africa has recorded since 2000 (Baloyi et al. 2013). Given that investments in infrastructure linked with large mining projects are happening, it is important to understand how these investments are being planned and made, and their implications for economic development in the region.

Such investments could be organised as part of enclave developments where there are few if any linkages with the local economy and special incentives mean the returns are largely appropriated by transnational interests in partnership with a narrow elite. Alternatively, the attraction of the mineral resource could mean it is used to stimulate investment in shared infrastructure as part of developing diversified capabilities and industrialization. This includes backwards linkages into supplier industries and services.

Spatial development initiatives and corridors have attempted to link these dynamics. The initiatives identify major infrastructure investments made to serve a key industry or user and design them in such a way that they can be more widely accessed. The spatial perspective is envisioned in the African Union's (AU's) Mining Vision policy document which draws from a range of policies including the Resource-based African Industrialization and Development Strategy (RAIDS) (AU, 2009).

There is a critical regional dimension to the questions of infrastructure, growth and development. First, major infrastructure developments often stretch across borders. Second, the development of diversified capabilities needs to be understood at the regional level and the large lead firms operate across the region. Third, initiatives to support such development need to be coordinated regionally if they are to have maximum impact.

To analyse the questions of the implications of major infrastructure investments associated with mineral resources, and the linkages and interests involved, we take an in-depth case study of the transport infrastructure developments associated with the exploitation of coal resources in Moatize. In particular, we examine the investments in rail along the Nacala and Sena corridor which is the recipient of major investments. The foreign investment into the Nacala project represents 35 percent of the country's Gross Domestic Product (GDP).

We use this case study as a substantial proportion of the large investments have now been planned and are underway and can be studied. Tete's coal deposits were discovered over 100 years ago but have only recently been developed (World Bank,

2010). This has been done with the assistance of the World Bank's International Financial Corporation (IFC) whose mandate was to assist the government in selecting a suitable candidate through a competitive bidding process to develop the Moatize mine (IFC, 2008). In 2004 Vale, the Brazilian mining giant, was announced as the winning bidder and started production in 2011. Other mining TNCs including Rio Tinto and Beacon Hill are also mining coal resources in close proximity. Vale's contractual obligations included investments in the Nacala railway line and port.

The case study describes the transport infrastructure developments in terms of the main activities involved and the arrangements including the lead firms, the state actors, and the policy framework. The description of main activities works from the projects' design, construction, material inputs and main services. This provides the factual base to enable a critical assessment of the direct linkages to the local and regional economies in the short term. This assessment involves understanding how the investments have been organized. We assess the institutional dynamics in terms of the lead firms, the role of the Mozambique state, and influence of other organisations such as the World Bank.

The study further assesses the relationship of the infrastructure investments with the development of capabilities at the local, national and regional level. The key questions that the study seeks to answer are;

- What drives winning a contract?
- What are the key considerations taken by clients along the supply chain when awarding contracts?
- To what extent are local (Moz) and regional (SA) linkages being built given competitive and procurement dynamics?
- What are the challenges to local (Moz) and regional (SA) linkages given competitive and procurement dynamics?
- What partnerships should be built in order to improve local and regional linkages given competitive and procurement dynamics?

The paper is organized as follows. Section 2 sets out the nature of construction activities with a focus on very large scale transport infrastructure projects. Section 3 provides the context on regional rail infrastructure development, including in the extraction of coal in Mozambique. It also reviews information and literature on construction capabilities and the construction sectors in Mozambique and South Africa. Section 4 the main focus areas and why these priorities have been selected, Section 5 analyses the relationship between procurement framework and linkage development followed by various actors involved in infrastructure provision. Section 6 analyses the structure of the Mozambican construction sector and analyses the relative performance and strategies pursued by regional, foreign and local Mozambican firms in accessing the infrastructure market segment. Section 7 reviews the outcomes of South Africa's linkage development policy along the rail infrastructure value chain and section 8 concludes the analyses and makes recommendations.

2. The Construction Value Chain

Construction is typically separated into several segments, namely, housing, commercial and industrial buildings, civil engineering structures and infrastructures, public works and repair and maintenance. We are focused on large scale transport infrastructure, which involves civil engineering along with specialised work related to the specific transport mode. While, in general, construction has historically been localized, there has been growing internationalization as large firms with strong domestic bases seek work in other countries. Very large projects in developing countries have also often been undertaken by transnational construction firms and linked to the financing of the projects.

A further impetus to internationalisation of construction over the past decade has been the activity associated with the rise in commodity prices as companies jockey for projects that facilitate extraction. This has catalyzed the entry of traditional and new international construction firms competing over contracts tied to state or private clients (the latter being logistics consortiums and global mining giants). Mozambique is no exception.

In beginning to understand how these activities may or may not facilitate local and regional industrialisation, the section will frame the discussion by first characterising the construction process and actors of large-scale infrastructure projects. It then analyses the sources of competitiveness as a means of understanding factors that determine a firm's ability to win a contract. We then consider the governance of large-scale complex infrastructure projects and their implications on the client's or promoter's procurement strategy.

2.1 The particular nature of construction

Construction is considered a process rather than an industry as it links together a variety of actors working temporarily together in the conception, design, construction and maintenance of the built environment (Gann and Salter, 2000: 959). Construction of large projects follows the Front End Loading² (FEL) project cycle. The project dimension implies that the management of firms through complex interfaces in which collaboration is essential to deliver the product and service. Therefore, the performance of the project is dependent on the efficient functioning of the network rather than a single firm and requires that technological strategies are extended beyond the immediate bounds for effective management.

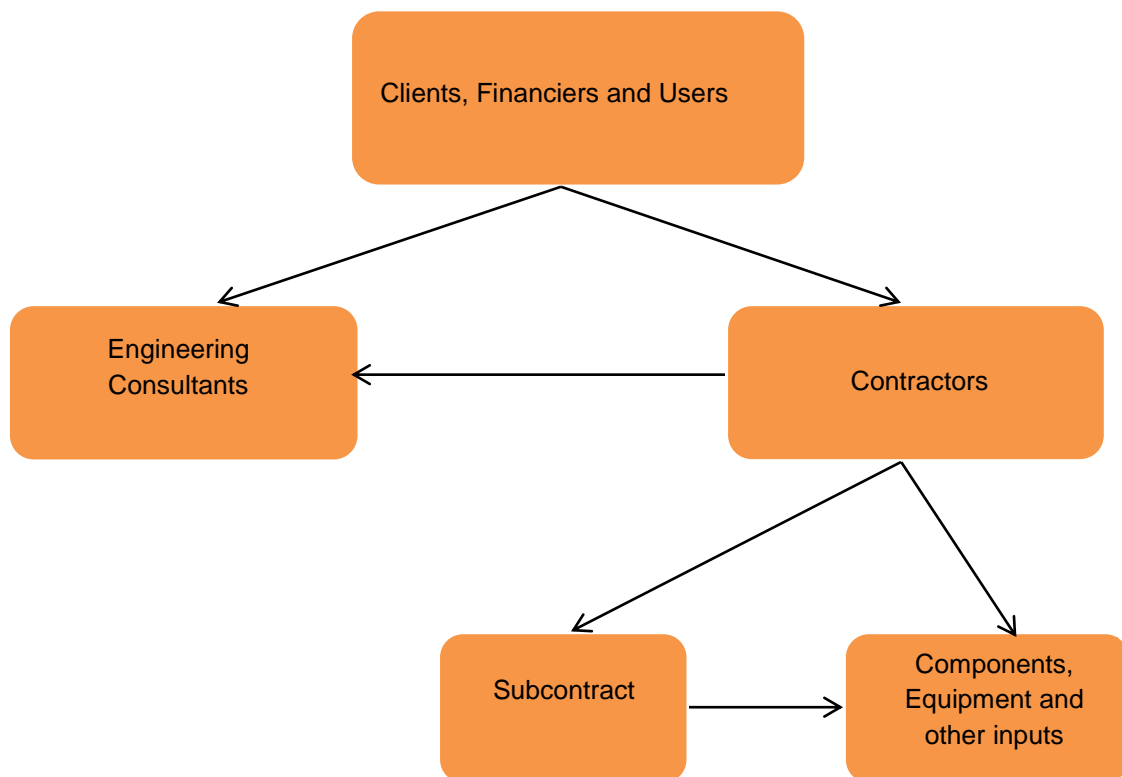
Project-based firms in construction are characterised by the following (Gann and Salter, 2000: 959):

- design and production processes are organised around projects
- they usually produce one-off, or at least highly customised, products and services;
- they operate in diffuse coalitions of companies along the supplier-customer chain.

² Front End Loading is commonly used to illustrate the value and opportunity that may be realised by doing upfront work in the early study phases of the project life cycle when there is still the potential to influence the successful outcome of the project.

The literature mapping the construction industry as a value chain in the main considers the tasks, types of decisions and actors involved in each stage of the construction value chain that converge to produce infrastructure or a building ready for use (Figure 1).

Figure 1: Construction industry value chain



Source: Authors construction

The construction industry's decision-making matrix can be broken down into three main systems - the strategic value system, the tactical value system and the operational value system (Wong, Chueng and Chan, 2004). This helps to understand the key interests and decision-makers, and thus why the project may be structured in the way that it is.

The strategic value system is at the corporate client level wherein tasks such as the project's mission and objectives are defined and the infrastructure-financing package is arranged. These decisions may either have a profit motive, a social motive or a combination of the two.

The next phase is the tactical value system at which stage the client has outsourced the project delivery to the construction industry, including through a design and build or turnkey arrangement with a lead firm. Therefore the tactical phase comprises of actors that are contracted by the client to implement the client's concept and technical specifications. The tasks performed at this stage are: feasibility studies for the project,

project design, and the construction itself. Engineering companies or consultancies perform the project feasibility and design. Civil and building contractors perform the construction work. The teams in the tactical phase draw on the construction materials and equipment suppliers to construct the infrastructure.

The operational value system is the last phase and at which point the tactical team hands over the project to the client or operating team for use.

2.2 Construction Value Chain: Competitive drivers and governance drivers

There are two ways in which the current state of localization and regionalization of the construction value can be framed. The first is to understand the drivers of competitiveness in the construction value chain which focuses on the firms and their ability to win contracts for work. The second is to analyse the governance of the construction value chain in terms of the decision rules, norm and standards and interests that influence the procurement strategy.

Drivers of Competitiveness in Construction Value Chain

The increasing complexity of infrastructure projects requires a range of skills in order to execute the project within time, at competitive cost and at the set out quality so as to avoid cost overruns, delays and a substandard hazardous product. The capabilities required are those that cut across all activities in infrastructure projects and these are augmented by “new” forms of organizing the construction project in order to enhance coordination and efficiency. The more generic capabilities that cut across all the activities in the infrastructure project according to Emuze (2011) are: project delivery skills management, knowledge management and transfer sharing, construction logistics activities, coordination and respect for Health and Safety.

Project delivery skills management: competent designers, suppliers and contractors are important for the construction process, and know how to link the project with its goals. These competencies are complex and therefore require teams with tacit knowledge to execute the project and to take prompt and decisive corrective actions in order to minimise project time and abortive work.

Knowledge management, transfer and sharing: This is critical to ensure that construction activities meet with overall project objectives. Therefore given the multiple actors on a construction site and also in the design phase, there needs to be a constant flow of information that is understood and can be actioned. This is supported by research on the drivers of competitiveness that has found that understanding the client’s requirements which is then effectively communicated across the chain is critical to the project’s competitiveness. This flow of knowledge is either formalized through plans or verbalized.

Construction logistics activities: These include managing material supply, workers, site equipment and information flows, which is managed by the project manager. Conditions required in order to execute a construction activity are: availability of appropriate skills, materials, access to work area, plant and equipment, design information, completion of previous critical tasks, acceptable weather, safe work

procedures. If one of these factors is not fulfilled the construction activity will be delayed or remain incomplete.

Coordination and Health and Safety: The majority of cases in which quality is not satisfactory is due to procurement related barriers. These include fraud and corruption in appointing contractors that cannot undertake the work. Moreover this tends to be in the design and construction and also in the way in which the client's agent does not ensure quality. Therefore the role of all members of the value chain affect the quality of the project. Moreover, governments have enacted legislation for the protection of health and safety in construction projects. These standards are practiced by large private and public clients and are thus an important capability for complex projects such as civil construction.

The success of a construction project is not only in the hands of the contractor – there is a range of different participants at each project stage, and knowledge requirements that need to be met (Table 1). Project managers, developers, facility managers, planning authorities must be able to identify a need for a project, its purpose, funding requirement that is acceptable and firms that can execute the work. Consulting engineers must be able to design and specify the project details such as interpreting project goals to specify the project characteristics, the material requirements, estimate the project cost etc. Contractors must be able to ensure that all the materials have been specified, identify where they can be sourced, how and when they are required on site, organize the construction participants, for example, subcontractors, workers, suppliers such that they work efficiently and preserve the quality of the project. Facility managers or clients must be able to make use of the facility and to ensure that it is operating optimally and it serves its customers or its public.

Table 1: Construction Process Capabilities

Project Stage	Knowledge requirements	Participants
Conception	Do we need a project? What purpose will the facility serve? How much funding can we commit to the project? Where is it going to be built? How will the facility be procured? Who are the best firms to do the job? Who will look after our interests?	Development managers; property managers; project managers; financial consultants; facility managers; business managers; planning authorities
Design and specification	What does the client really want? What are the characteristics of the site for the facility? How do the relevant regulations apply to this facility? What will the facility look like? What kind of materials do we need, and in what quantity? How much is it going to cost? How will the facility be constructed?	Architects; engineers (building services, civil, structural); planning supervisors; facility managers; quantity surveyors; project managers; contractors
Construction of infrastructure	Have all materials been specified? Where can we obtain the materials? How and when do we need them on site? How can we organize ourselves better to do the job efficiently? How can different components be assembled efficiently? How can we ensure the quality of workmanship?	Contractors; project managers; specialist contractors; materials and equipment suppliers; architects; engineers

Commissioning and handover	Is the facility performing as expected? Is it serving the purpose for which it was created? Are all components and systems working effectively? Are all interest groups satisfied?	Facility managers (operators); architect; contractors; clients/or end users
----------------------------	--	---

Source: Emuze (2011)

The last two decades has seen the emergence of new forms of organising construction projects. There has been a shift from what is known as 'client driven' construction projects towards 'contractor driven' construction projects.

Client driven construction is the more conventional approach in which the client is the key actor that drives the supply chain. Therefore the client is involved in contracting the consulting engineers, the main contractor and may be involved in nominating the material suppliers and subcontractors. The benefit of this strategy is that the client knows the costs and performance before project commitment. Therefore the client must have some knowledge of the project's definition and delivery value, be able to create contractual agreements and measure performance. Clients with limited knowledge in these areas will rely on external advisors.

The literature argues that the conventional approach to contracting is becoming less favoured for two reasons. Firstly, client driven chains undermine competitiveness as the contracting of separate actors, who in turn subcontract others, creates fragmentation and coordination failures. Therefore this form of contracting heightens the fragmentation inherent in the contracting process as there is little to ensure team cohesion such that contractors are liable to each other's work. Secondly, clients skills required for planning and managing infrastructure projects have been eroded therefore are increasingly reliant on contractors that are able to package each of the core phases of the construction process. These skills have become increasingly important as projects become more complex and project details are uncertain before project commencement. This, of course, depends on the client in question.

As a result, increasingly clients demand that contractors are able to deliver on a complete project in 'contractor driven' approaches. There are a range of procurement strategies that have emerged. We discuss the most popular, namely design and build (D&B), and turnkey (that is, Engineering Procurement Contract Management, EPCM). The D&B approach entails the client contracting a single firm to oversee the design and construction decisions of the project pipeline. Emuze (2011) outlines that the turnkey approach is similar to the D&B, however the contractor is responsible for all the tactical decisions in the project pipeline including feasibility. A popular variation of a turnkey project in "public facilities" is the Build Operate and Transfer procurement practice, which allows the EPCM firm to operate the facility through a concession after which the facility is transferred to the state over a contracted period. The BOT procurement practice requires that the EPCM also finances the package. The BOT has been popular in developing countries given their limited financing and has been associated with concessioning and privatization.

The obvious implication is that the client's concerns with time, cost and quality of the project mean that only contractors with a track record and reputation for quality and

delivery time, ability to deliver a turnkey project and cost competitiveness will be considered. This implies that development objectives, such as supply chain development or localization of activities will only be pursued if there is a strong policy framework and mechanisms for monitoring and enforcement.

A narrow focus on competitiveness framed solely in terms of capabilities, costs and the ability to overcome coordination problems also ignores the power relations and interests both within and across the infrastructure construction chain that are critical factors in determining the winning bid. We now turn to questions of the governance of procurement and its implications on building local and regional industrial capabilities.

Governance of large scale construction infrastructure projects: characterising clients and financing linkages

The term governance refers to those actors within the decision chain that have the power to set and enforce rules on other actors. The use of the term in this instance refers to those actors or decision makers with the power to determine the type of procurement strategy followed to execute the project. The procurement strategy is critical as it determines what is acquired and how it is acquired. It is defined as the “process which creates, manages and fulfills contracts relating to the provision of suppliers, services or engineering and construction works and acquisition of rights and concessions” (Emuze, 2011: xxiii). Therefore, the procurement strategy determines what actors are involved and how teams of designers, suppliers and contractors work together and is the basis of the contractual arrangements entered into between the client and the project participants.

The governance framework must assess the importance of different actors and core linkages in influencing the extent to which local and regional industrial capabilities are built. This is done by identifying the clients and lead firms in large infrastructure projects and their linkages to core sources of power.

A key dimension underlying power is the financing of projects. In Africa, governments including official development aid are the primary sources of funding of infrastructure in power, transport and water supply and sanitation (Foster and Briceno-Garmendia, 2010). The private sector dominates the information and communication technology (ICT) sector (Table 2).

Table 2: Sources of Finance of Africa's Infrastructure Sector, USD billion

	Operation and	Capital Expenditure Annualized averages for 2001-06	
--	------------------	--	--

	maintenance						
Infrastructure Sector	Public sector	Public Sector	ODA	Non-OECD financials	Private sector	Total	Total Spending
ICT	2	1.3	0	0	5.7	7	9
Power	7	2.4	0.7	1.1	0.5	4.6	11.6
Transport	7.8	4.5	1.8	1.1	1.1	8.4	16.2
WSS	3.1	1.1	1.2	0.2	2.1	4.6	7.6
Irrigation	0.6	0.3				0.3	0.9
Total	20.4	9.4	3.6	2.5	9.4	24.9	45.3

Source: Foster and Briceno-Garmendia (2010)³

Government interests behind ODA have traditionally used aid as a means of facilitating the entry of their own firms e.g. construction companies into the recipient countries, this is otherwise known as tied aid. Moreover, other financial support measures have been used to facilitate the easy entry of construction companies from their economies. On the other hand ODA has also been used as a means of building capabilities within developing countries through linkage development programmes. In transport infrastructure, the convergence of donor, state and private interests has been facilitated through Public Private Partnerships. These actors are critical in determining infrastructure provision in Mozambique. Therefore it is critical to observe their interests as this has a bearing on the extent to which transport infrastructure supply is localized and regionalized.

In mineral rich countries, the exploitation of minerals has been a pulling factor for major transport infrastructure investments. Two new clients have emerged within this context, namely large **global mining houses** and **global logistics consortia** companies. Global mining houses seek control of the logistics routes in order to facilitate the secure supply of the commodity to the export markets. Linked to this are logistics consortia that seek to operate financially viable transport facilities that are made financially viable by the performance of bulk freight mineral commodity prices.

The foreign direct investment literature (see for example Unctad, 2005) observes that global multinationals tend to move with their supply chain with whom they have established relationships formalized through supplier contracts or through informal means. These dynamics will also have a bearing on the extent to which the construction supply chain for transport infrastructure provision can be localized and regionalized.

The conflicting interests poses a question on how the role of the state at the local and regional level can be used to facilitate the development of local and regional industrial

³According to Foster and Briceno-Garmendia (2010) the data is annualised averages for 2001–06. Averages weighted by country GDP. Figures are extrapolations based on the 24-country sample covered in AICD Phase 1. Totals may not add exactly because of rounding errors. ICT = information and communication technology; ODA = official development assistance; OECD = Organisation for Economic Co-operation and Development; WSS = water supply and sanitation. — Not available.

capabilities. This depends on an understanding of the state and political economy, which take into account the arrangements and agreements reached between different interests and whether this ultimately promotes local capabilities development and learning (see, for example, the political settlements framework of Khan, 2006). With specific reference to understanding which political incentives encourage the governance of learning in extractive industries Buur (2013) proposes that this is a function of three interconnected relations: the extent of mutual interest between ruling elites and relevant groups of capitalists; whether there is elite bureaucracy relations that result in pockets of administrative efficiency; and how interactions between bureaucrats and capitalists facilitate learning for productivity (Buur, 2013: 69).

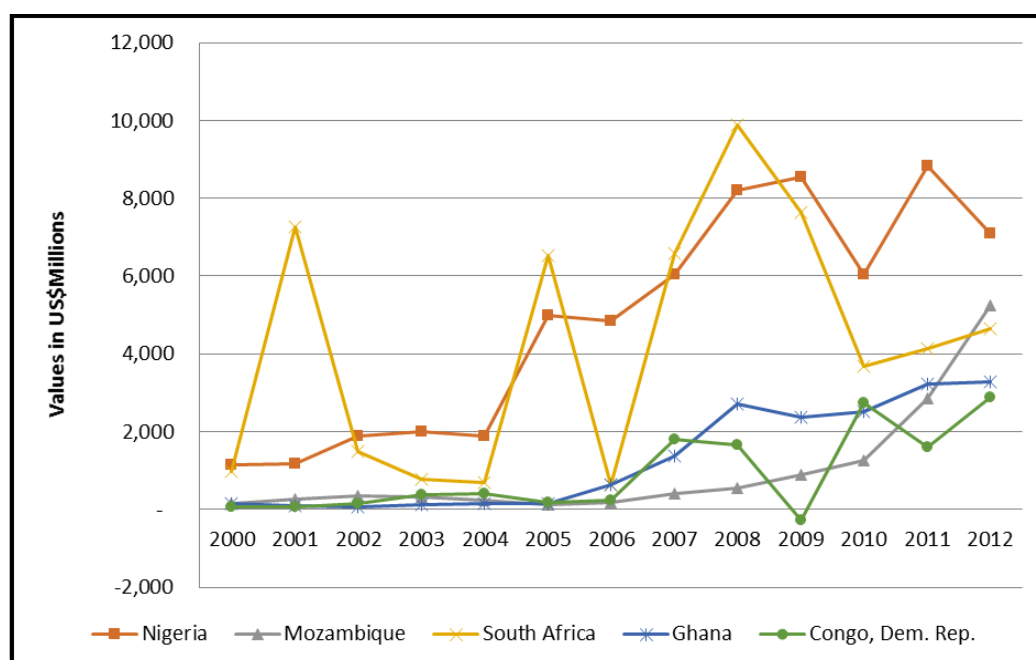
Given that resources are being exploited by transnational mining companies, African countries are reliant on these firms activities for the collection of revenue due to the absence of a strong local industry. If the investments in mining are delayed then so are the revenue streams. This implies understandings of mutual support (albeit with a very unequal balance of power) between foreign firms and the ruling elite. While mutual interest may be secured this may not be in the form that allows the other two factors that contribute to successful industrial policy implementation to flourish. That is, there may not be elite and bureaucracy relations that result in pockets of administrative efficiency, and the facilitation of learning through interactions between bureaucrats and capitalists. In line with Khan (2006), these three factors of successful industrial policy do not necessarily mean that corruption and self-enrichment cease to exist; rather it implies that these are managed in a manner that ultimately ensures that broad based industrial development is pursued.

An analysis of the relationships between these interests - the state, donors, logistics consortia, mining houses and elite interests - is important in order to understand how rents from infrastructure are extracted and their impact on procurement strategy and the outcomes on local and regional capabilities being built from infrastructure provision.

3. Mapping the regional rail infrastructure development: a case of Mozambique and South Africa

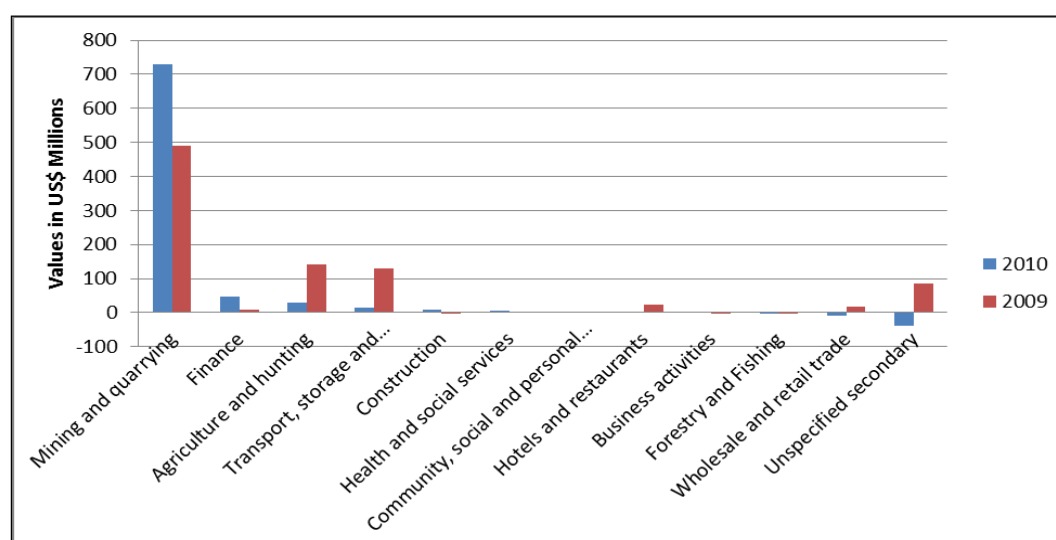
In recent years, Mozambique has been experiencing economic growth which has been heavily linked to discoveries of natural resources. Large fields of coal and natural gas have been discovered. Mozambique is developing an emerging role as one of the world's most important coal exporters, and it is on its way to become the first liquid natural gas supplier in Sub-Saharan Africa (Ford 2012). These new developments have resulted in surges of foreign capital inflows into the country (Figure 2), dominated by mining and quarrying (Figure 3)

Figure 2: FDI inflows to selected African Countries



Source: IMF database (2014)

Figure 3: Mozambique Capital flows by Sector, 2009 and 2010



Source: IMF database (2014).

Note: Unspecified Secondary captures all FDI data that cannot be allocated accurately

3.1 Mozambique: Overview of Coal Developments and Transport Infrastructure

Mozambique Coal Developments

Mozambique's Tete province (in the north of the country) is home to the single largest discovery of unexploited coking coal in the world. These discoveries were made over a century ago and are only recently being developed. The former colonial power, Portugal, made little efforts in committing investments in prospect and exploration. Developments in the first few decades of post-independence were held back by civil war that came to an end in 1992 during which time South African companies made failed attempts to explore the region. The growing interest in Africa's minerals sparked by the recent commodity boom has resulted in a number of multinational firms jockeying for control of the region's coal resources. The first mover agents responsible for coal mining development since the boom are Vale, the diversified Brazilian mining and logistics giant, International Financial Institutions and the Government of Mozambique (GoM).

In 2003, the GoM engaged the International Finance Corporation (IFC) to secure a developer and set conditions for the successful development of the Moatize coal mining project (Perkins and Robbins, 2011). The duty of the IFC was to assist government in identifying the best candidate after spending ten unsuccessful years of trying to lure investors to the Moatize mine. A total of ten companies which included mining giants such as Anglo American Corporation, Rio Tinto, Mitsubishi, Vale Do Rio Dolce (Vale) and BHP Billiton submitted bids for the project and Vale emerged as the overall winner. Vale, bid \$123 million for the right to explore and develop the coal deposits (Perkins and Robbins, 2011). The government saw this project as a key driver for the development of the Zambezi Valley due to the size of the project.

After being announced as the eventual winner in 2004, Vale had commitments to conduct feasibility studies for the coal project, develop the rail and port infrastructure and pre-feasibility studies of setting up a 100 megawatt coal fired power station and other industrial projects (Perkins and Robbins, 2011). In 2007, the mining company obtained all the necessary requirements from government after spending \$80 million on feasibility studies and commenced construction work at the mine in 2008. It contracted the Brazilian companies Odebrecht and Camargo Correa to undertake construction and civil engineering work, which included the construction of one of the biggest coal handling preparation plants in the world with an annual capacity of 26 million tonnes (Perkins and Robbins, 2011).

The awarding of the contract to mine at Moatize mine acted as a major milestone in terms of attracting other investors around the world which the country had been struggling to lure. These developments, as well as those linked to the discovery of natural gas finds in Pemba have resulted in surges of foreign capital inflows into the country.

It is clear from an examination of current and potential extractive megaprojects that Mozambique's coal sector is very significant, especially in the current projects (Tables 3 and 4). Perkins and Robbins (2011) observe that 82 coal exploration licenses were granted to 33 mining companies in 2011 amongst other minerals.

Table 3: List of current extractives megaprojects in Mozambique

Company name	Sector	Location	Capacity	Construction	Production
Hydroelectrica Cahora Bassa HCB HCB_North	Electricity generation	Cahora Bassa, Tete	- 2075 MW - 1240 MW	1969 – 1975	1977
Mozal Mozal I Mozal II Mozal III	Aluminium smelter	Beluluale Industrial Park, Maputo	- 245 000 tonnes - 245 000 tonnes	1998 – 2000 2001 – 2003	2000 2003
Sasol - 50% expansion	Natural gas	Pande and Temane gas fields, Inhambane	154 GJ 183 GJ	2002 – 2004 2011	2004 Ramp up by 2016
Kenmare - 50% expansion	Heavy sands	Moma, Napula	- 600 000 tonnes - 300 000 tonnes	2004 2011 – 2012	2007 2013
Vale	Coal	Moatize mine, Tete	25 million tonnes per year	2007 – 2011	2011
Rio Tinto	Coal	Benga mine, Tete	45 million tonnes per year	Acquisition in 2010	2012
JSPL	Coal	Changara district, Tete	10 million tonnes		2012 – 2016 ramp up
Beacon Hill	Coal	Moatize, tete	87 million tonnes of reserve	Acquisition in 2010	2013

Source: Genesis Analytics (2013)

Note: We assume that capacity for Coal is planned capacity.

Table 4: List of Mozambique potential megaprojects

Company name	Sector	Location	Capacity	Construction	Production
Mphanda Nkuwa	Electricity	Zambesi river, Tete	1500 MW	2014 – 18	2018
Anadarko (US)	Natural gas	Rovuma basin	10 million tonnes per year	2014 – 19	2020
ENI (Italy)	Natural gas	Rovuma basin	10 million tonnes per year	2014 – 19	2020
Statoil (Norway)	Natural gas	Rovuma basin			
Petronas (Malaysia)	Natural gas	Rovuma basin			
Minas de Revuboe	Coal	Revuboe, Tete	5 million tonnes per year	2013 2015	-2016
Ncondezi (integrated mine and power plant)	Coal and thermal power	Tete	1.2 million tonnes per year / 300MW	2015	2016 (mine), 2017
Baobab Resources	Iron ore	Tenge/Ruoni deposit, Tete	725 million tonnes		
ENRC Coal transport logistics Coal mines Corridor Sands	Rail line Heavy sands	Tete Chibuto, Gaza province	40 million tonnes per year 20 million tonnes per year	2014 2015 2014 - 2015	-2016 2016

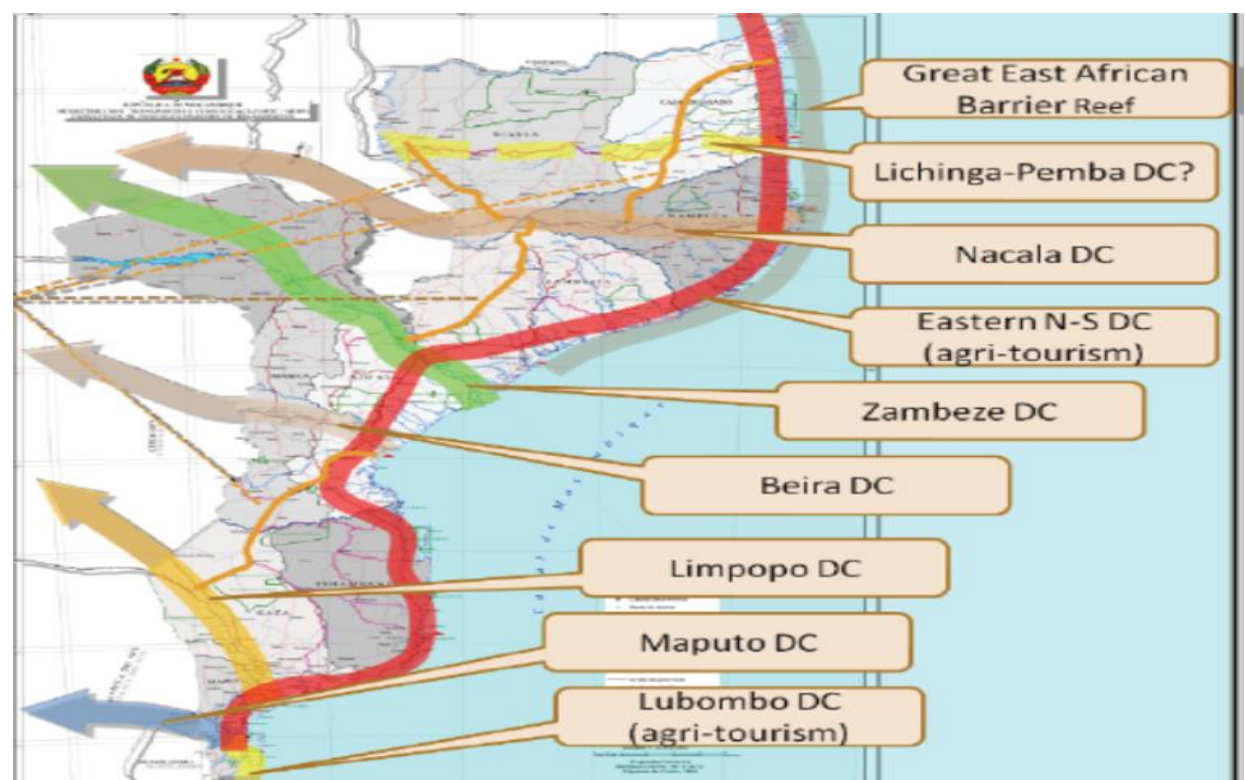
Source: Genesis Analytics (2013)

Mozambique's coal linked transport infrastructure

Transport infrastructure in Mozambique was primarily built as a political and economic imperative to link neighbouring countries with industries in the hinterland to the country's ports.⁴ Consequently the country's most developed logistics systems run westwards and do not adequately link the producing agrarian north of the country to the consuming south of the country, rather they have been used to facilitate international transit. Transport services became the key source of accumulation during the colonial period, contributing 31 percent to the country's foreign exchange in 1972 [Stephens, 1994:66] and 12.8 percent to GDP (Stephens, 1994: 124).

Coal developments are, however, fast reshaping the infrastructure system although not necessarily in a break with the historical patterns. The main exit points for the Tete coal mining industry are through the Beira Corridor which connects the Sena railway line to the Beira port and the Nacala Corridor which connects the Nacala railway line through Malawi to the Nacala port (Figure 4). Tete is just over 500 km from Beira, its closest port, and just over 800 km from Nacala port.

Figure 4: Map of Mozambique



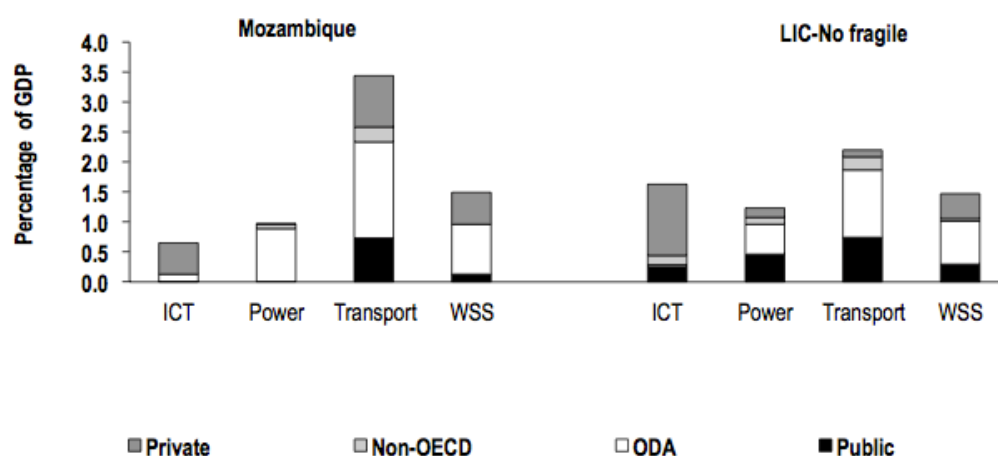
Source: CFM

The major threat for mining companies to reach their objective of increasing output on export markets has been the government's inability to provide or facilitate the requisite infrastructure and meeting the financing gap for investing in new rail lines or rehabilitating the existing ones (Nhabine *et al*, 2012). Unlike in the 'typical' African country described by Foster and Briceno-Garmendia (2010), discussed above,

⁴ The historical political imperative included the Afrikaners trying to side step the use of the British controlled logistics system in Natal.

Mozambique relies on ODA followed by private investment to finance transport infrastructure provision (Figure 6). The picture may have changed slightly in recent years seeing that the major investments taking place in the transport sector are being financed by the private sector. The project funder usually influence the awarding of contracts through their procurement guidelines and this may not be in the best interest of government.

Figure 5: Comparison of sources of finance for infrastructure in Mozambique and Low Income Countries



Source: Dominguez-Torres. and Briceño-Garmendia. C (2011), *Mozambique's Infrastructure: A Continental Perspective*

Public Private Partnership (PPP) concessions had been awarded by the government for the rehabilitation of infrastructure projects in the early 2000s, but each has been a qualified failure due to various reasons as indicated in table 5 below. The state's drive to fast track transportation development was built into the Moatize open tender in which an additional criteria set was plans for the transport infrastructure development.

Table 5: Performance of Concessionaires in Mozambique's Nacala, Beira and Zambezi Corridor Transport Infrastructure

Infrastructure	Concessionaire/ Owner	Obligation	Performance & Reason for Termination if ended
Machipanda/ Sena-line	Caminhos de Ferro do Beira (CCFB) is PPP made up of private Indian consortium Ricom (51%) & the state rail & harbour co. Caminhos de Ferro do Mozambique (CFM) (49%).	Rehabilitate and expand the operational Machipanda line near Zim & the non-operational Sena line by 2009. Expand capacity from 2 mt to 6mt	Concession began in 2005 and was terminated in 2011 after Ricon failed to meet completion deadline (2009) and it was found that technical standards not met. CFM forces Ricon out and takes over. Sena line starts operating at the end of 2011 and upgrading was completed in January 2014.
Nacala line and Port	Corredor de Desenvolvimento do Norte (CDN) is the PPP made up of the private US Rail Development Corp (RDC) and CFM	Rehabilitation of lines from Malawi to Nacala port on a 15 year concession and Nacala Port	Concession began early 2000s but little improvement with fall in cargo over time. RDC is bought out by Insitec, a local Mozambican company, but control is left under CFM. Vale acquires 70 % of CDN as coal production is hampered by transport constraint.
Beira Port	South African company Correlider (70%) and CFM (30%)		Not terminated although complaints of logistical and administrative inefficiencies. Added a coal terminal.

Source: Baloyi et al (2013), Agencia de Informacao de Mocambique (2014).

As a result of problems with the pace of transport infrastructure growth, it is clear that foreign coal mining companies are utilizing their financial power to conduct build-your-own strategies to complement their investments in mining (Table 6 and BMI, 2013).

Table 6: Mining Company Transport Infrastructure Strategies, 2013

Owner	Logistics strategy
Ncondezi	Production to start once rail and port at advanced stage.
Anglo American	Transportation not secure. Nippon Steel invites Minister of Transport and Communication to Japanese plant. Jap Minister of Economic, Industry visits Moz meets with Ministers and President to ensure security of transportation for the company.
Beacon Hill	Secures 0.5 MT of Sena line Feb 2013, Leases rolling stock from Thelo which is 50% owned by Industrial Development Corporation and another 50% by Thelo holdings. Shipment was expected to start 2013 Q2 but was delayed due to low international coal prices and delay in delivery of rolling stock for exports. Grindrod appointed as rail operator. To pay CFM rail access. The company faced working capital problems in 2014 and subsequently entered into administration on 12 January 2015.
Rio Tinto	On Sena line
Vale	Currently using Sena line but rehabilitation and expansion of Nacala line has started - expansion from Moatize to Malawi border then rehabilitation through to deepwater Nacala port which is also to receive face lift.
ENRC	Concession contract of new railway line from Chiuta to Nacala still under negotiation with CFM

JSPL	First exports were in May 2013 in which 36 600 tonnes was exported to India via the port of Beira. A total of 3mn tonnes were expected to be exported in 2013 and 10mn tonnes per year by 2015.
------	---

Source: Baloyi et al (2013), Campbell (2013),
<http://www.jindalafrika.com/mozambique>, <http://www.bhrplc.com/>

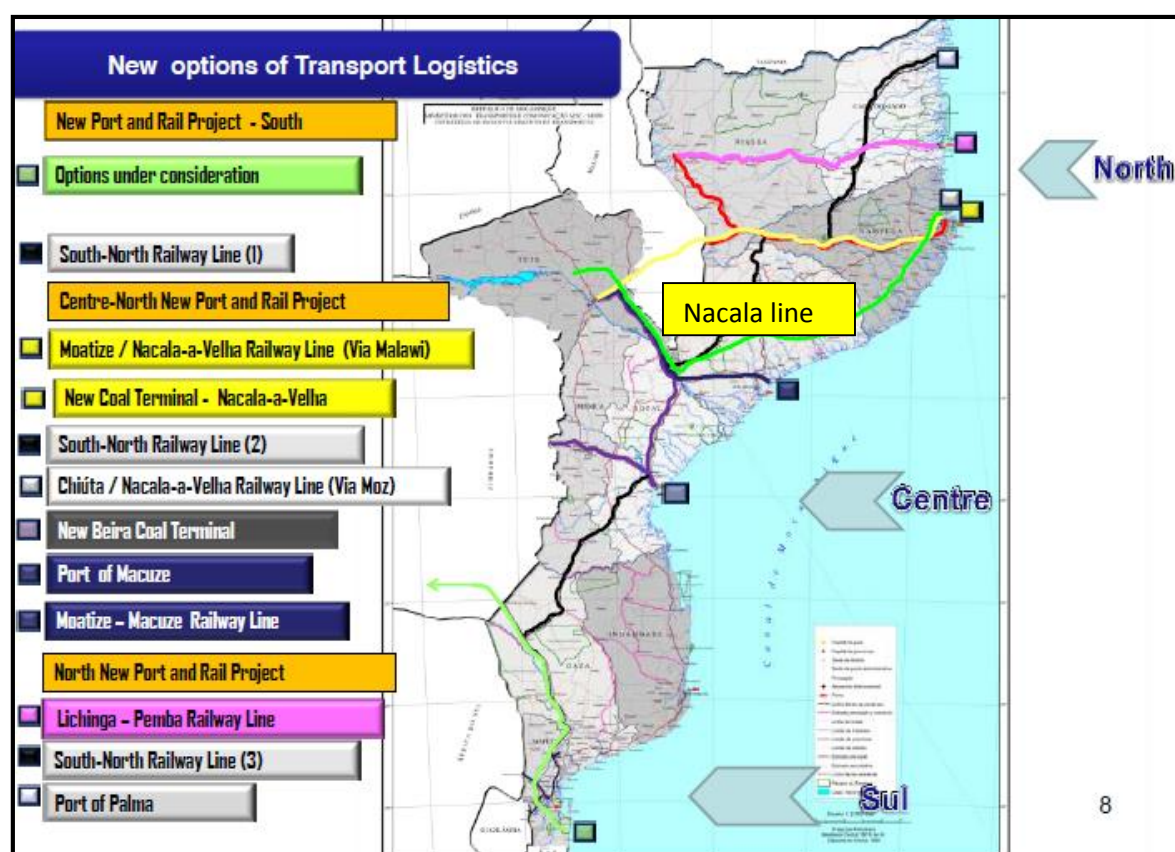
Vale's demand for transportation infrastructure has been leading the infrastructure rehabilitation. The first coal exports were recorded in 2011 and were transported from Vale's Moatize mine on the Sena line for exit at the Beira port. This was achieved after the hostile takeover of Ricon by Caminhos de Ferro do Mozambique (CFM), a state rail and harbour company, after Ricon's contract was terminated. Rio Tinto and Beacon Hill have also been permitted to use Sena rail line to transport minerals. There are still other players who also want to use the line but still have to negotiate with CFM to be granted access.

3.2. Mapping transport infrastructure projects and activity in Mozambique- The case of Moatize

Coal developments in the Moatize are fast reshaping the contours of the country's logistic system. Mozambique represents an interesting case because its mining sector is at the early stages of development and thus has not developed a cluster of supporting industries and infrastructure in the same manner that other economies with long traditions in the extractive sector have (i.e. South Africa and Zambia). Moreover, as some mining projects are yet to come on stream, it is expected that future demand for rail and ports will result in expansion of capacity.

Moatize, a small area near the Tete town in the Tete province has the major coking coal deposit identified to date in Mozambique and one of the largest in the world (Sanec 2012). It is estimated that about 12 billion tons of coal lie in this 200km² area. Due to the high concentration of mining concessions in the Tete region, the case study primarily focuses on related infrastructure projects around Moatize. As a high volume commodity, coal requires significant capacity allocation on rail and port infrastructure especially given the fact that most of it is exported. While its volume requires rail for transportation for mining houses to maximize efficiency from mining, ports become important to facilitate exports in overseas markets. Significant developments are already occurring in developing rail and port infrastructure. Rosenfeld (2012) argues that infrastructure upgrading, is likely to be one of the sectors whose development will be most closely linked to the evolution of the mining sector in Mozambique. A total of seven projects of rail and port infrastructure have been identified in Moatize and these are at various stages some being at conception stage and while others are at advanced stage of construction. The map below shows the proposed construction and rehabilitation projects around Moatize. Appendix 2 shows a summary of each of the seven projects. We turn to the detailed discussion of each individual project in the subsequent paragraphs below.

Figure 6: Rail Projects



Source: CFM. Nacala line is shown in yellow

There are three which are closely tied to Moatize, namely the rehabilitation of the Sena line and the developments at the Beira port to which it goes, and the investment in the line to the Nacala port. It appears as though the Sena and Nacala corridors⁵ are the only projects in which construction activity is taking place whilst others are in the conceptual, negotiation or tendering stages. Therefore the focus of the study will look at the developments taking place within those corridors. Another highlight of the discussion is that railway projects appear to be the major recipient of investments. Therefore the next subsection will describe the major components, inputs (goods and services) and processes required for the construction of rail infrastructure.

Rehabilitation of Sena line

The Sena railroad links the Moatize coal basin to the port of Beira. This railroad lies between the Beira and Nacala corridor. The project entailed the rehabilitation and expansion of the existing 673-km-long Sena railway line, which connects the Moatize coalfields, in the western Tete province, to the Port of Beira, in the central Sofala province. The estimated total cost of the project railway rehabilitation is \$2.27 billion and the main contractor to the project is Motto Engil and Visabeira. The project for the rehabilitation of the railway line has been subcontracted to a South African firm Grindrod Rail, which has capacity to do this work after they acquired RACEC in 2013.

⁵ See Appendix 2 for more details

Port of Beira

Negotiations of concession contract between Essar/CFM and Government of Mozambique has been concluded for constructing the port of Beira. An investment will be made for developing the terminal with a capacity of handling between 15-20 million tons a year. The port is estimated to cost US\$600 million. Construction of the port commenced in 2013 and is expected to be completed in 2015. The port is being built on a long-term concession for development agreed with government on a design, build, own, operate and transfer.

Moatize-Nacala line

The Moatize-Nacala proposed railway line is part of the Nacala logistics corridor in the northern parts of Mozambique. The line is being built after realizing that the Sena line from Moatize to the port of Beira is unable to handle the huge amount of coal exports. The line will link Moatize through Malawi to the existing Northern corridor to the Port of Nacala. The project involves construction and rehabilitation of the rail line and construction of a new coal terminal. It is being carried out under contract from Vale Mozambique, and is expected to facilitate the transportation of 18 million tons of coal per annum upon completion. The Moatize-Nacala line is broken down into eight sections and different contractors were awarded the sections. Construction of new railway track is covering 190.4Km while for the rehabilitation covers 721.5Km. The total cost for the whole project involving railway rehabilitation and port construction is estimated at US\$4.169billion breakdown of which US\$2.937billion is for the railway and US\$1.232billion is for the port construction. Feasibility studies for the construction and rehabilitation of the railway line were done in 2006 and work on the sections commenced in June 2012 and the project is expected to be completed in 2017. Work on the construction of the new coal terminal and quay for the Nacala-a-Velha commenced in July 2012 with hiring of works for the inspection of the terminal. Preliminary work started in September 2012 and the project is expected to be completed in 2017.

Below are the details of other projects that have been associated with the growth at Moatize. The projects spread much wider and are also at earlier stages of planning.

Chiuta-Nacala line

The Chiuta-Nacala railroad will link Chiuta in Tete province with Nacala in Nampula province of Mozambique. The project involves the construction of a new railway track and the new railway line will cover 1070Km and it is estimated to cost between US\$3-4 billion. The project is being funded by CFM Mozambique and ENRC a leading diversified natural resource company from Kazakhstan. Currently there are negotiations between CFM-ENRC and the Government of Mozambique on the concession contract and studies are being carried out. However, the companies are also raising funds for the whole project. There are currently no dates on when the project is likely to commence or be completed. After completion of the project the line is expected to transport 40 million tons of coal per annum.

South/North line

Another new railway line has been proposed which will connect Mutarara and Mutauli and thus connecting the northern and southern parts of Mozambique. The construction of a new railway track covering 470Km is estimated to cost US\$2.5 billion. The funders of this project are the Government of Mozambique and Chinese government. Currently a feasibility study for the project has been prepared by China Road and Bridge Corporation (CRBC) a Chinese firm. However, negotiations are still underway between the Mozambican government and the Chinese government on the terms of the funding as the Chinese will be funding the construction of the new line. There are no dates on when the project is expected to start and end, however after completion the line is expected to have a capacity of transporting 25 million tons of coal per annum.

Linha Ferrea Moatize-Macuse line

A new port and railway line has been proposed to connect Moatize and Macuse on the coast of Zambezi province. The railway track covering 525Km and port construction will cost a total of US\$3,5 billion. The project has three funders, CFM of Mozambique and ItalThai, a Thailand conglomerate with interest in construction and engineering services among others and Zambezi Integrated Development Corridor which are contributing 20%, 60% and 20% respectively. Work on the project is expected to be commence in 2016 and the completion date is not known. The line is estimated to have a capacity of transporting 25million tonnes of coal after completion of the project.

Lichinga-Pemba line

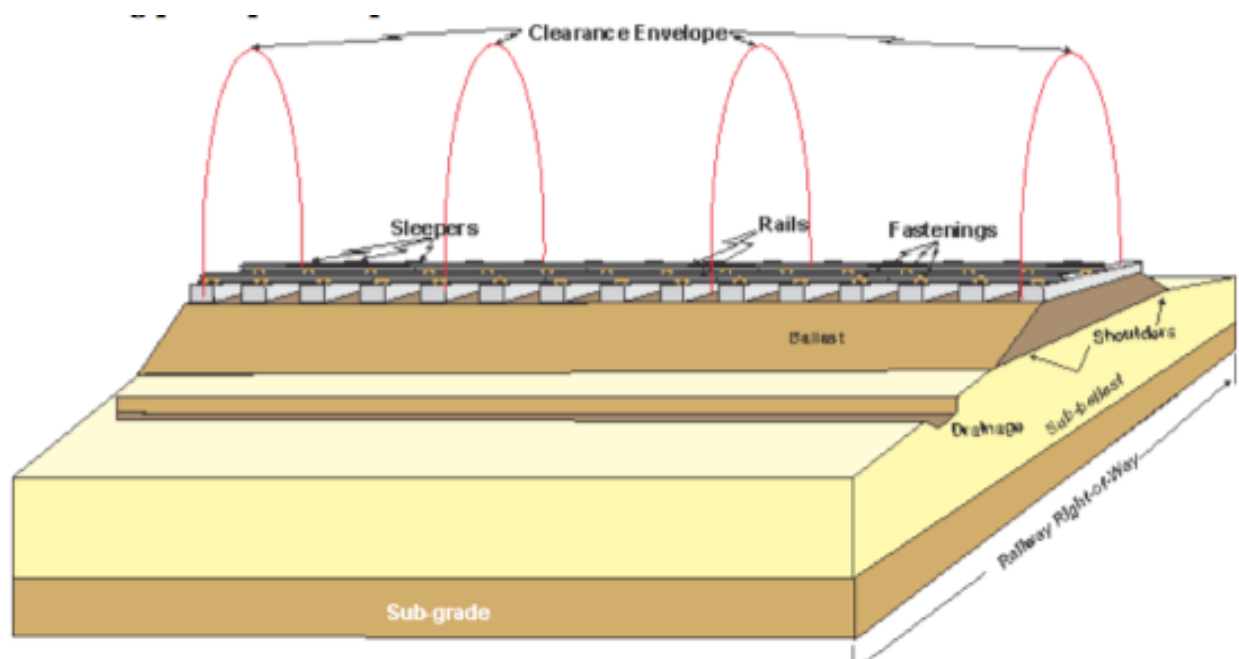
The first project is for the Lichinga-Pemba line for the Maniamba coal basin which. This line provides a network of railway that cuts across the northern parts of Mozambique from the Malawi boarder of Lichinga in Niassa province to the port of Pemba. The project involves the extension of 700Km of new railway line and port construction, which is estimated to cost US\$3.9billion. The new line is expected to have a capacity of to ferry a capacity of 25million tons per annum after completion of the extension. The project is still at the concept stage of market study and field findings, construction has not yet started.

3.3 Description of Basic Rail Infrastructure and Main Inputs

The largest component of rail infrastructure by value is generally the civil engineering work which underlies the track, and includes earthworks, bridges and drainage. We give a breakdown of these areas in more detail in subsequent sections. The railway is comprised of components that build the structure of the track and those that build the superstructure of the railway line (Figures 7 and 8). The structure of the railway track is comprised of the sub-grade, sub-ballast, ballast, sleepers or crossties, rail and track fastening (see World Bank, 2011). Track fastenings are used to secure the rail to the sleepers and facilitate the spacing between the rail and the sleepers. Fastenings include components such as spikes, fishplates, bolts, clips and anchors (see World Bank, 2011). These components are the foundations of the railway infrastructure each of which must be designed to fit the exact and unique dimensions of the track in question. Heavy loads like coal freight must be carried on railways with solid sub-

grades that are not set on weak underlying structures such as soft marshy soils (see World Bank, 2011). Moreover these loads require sub-ballast cross sections with angular rock such as granite.

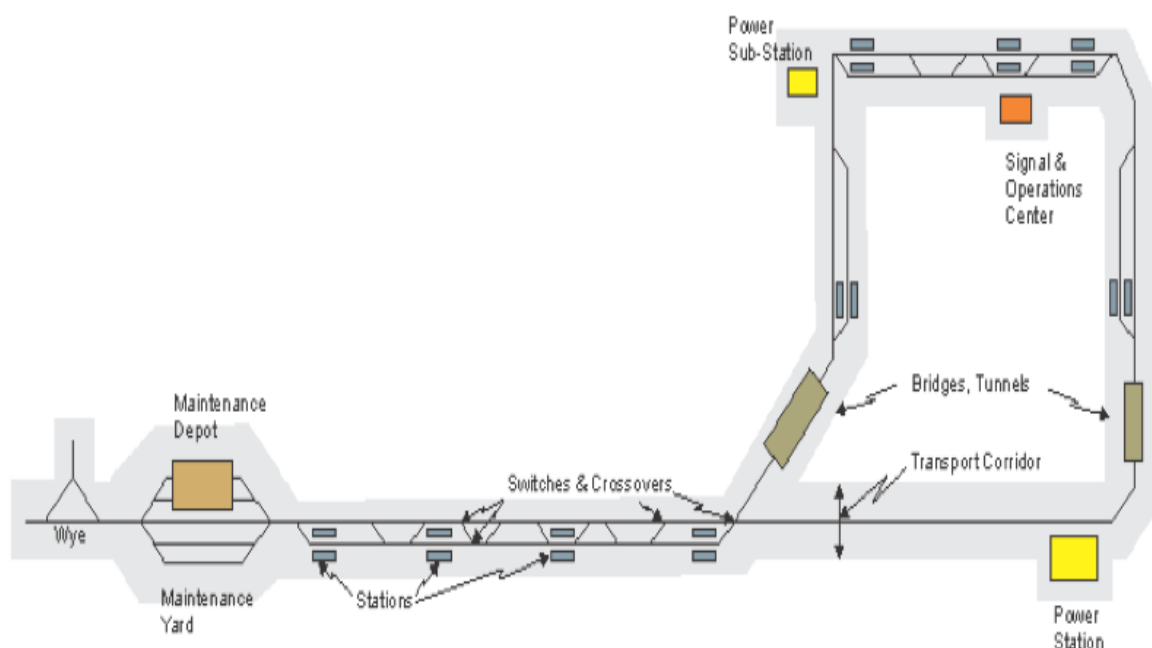
Figure 7: Rail Track Structure technology.



Source: World Bank (2011) *Railway reform toolkit: toolkit for Improving Rail Sector Performance*

Figure 8: Schematic of a short railway line

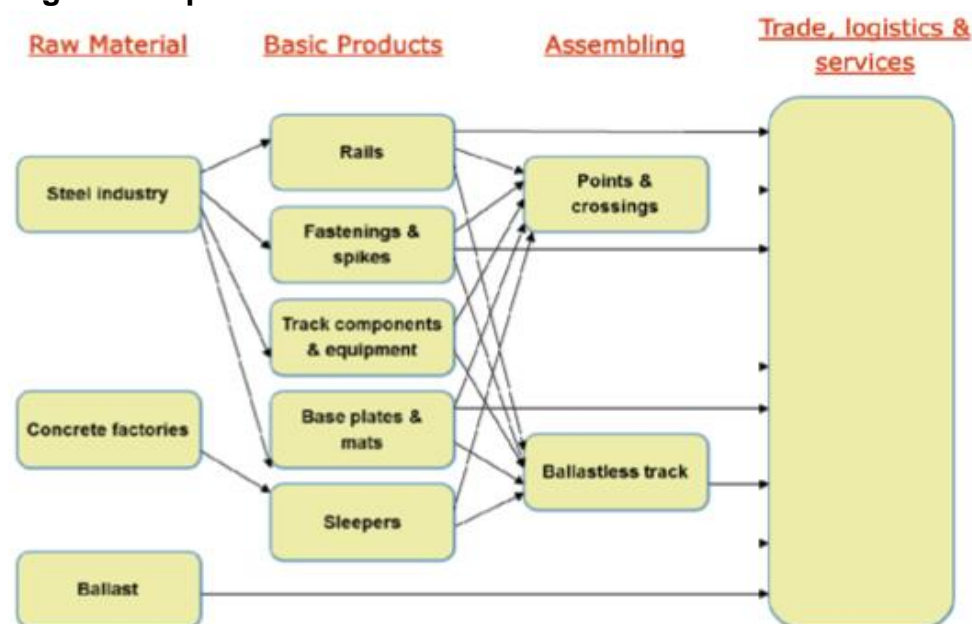
schematic of a short railway line:



Source: World Bank (2011) *Railway reform toolkit: toolkit for Improving Rail Sector Performance*

Construction of the rail track involves a range of material inputs which are combined with very substantial labour and services components, including logistics, design as well as the construction itself (Figure 9). The sourcing of inputs and production of basic products depends on the extent of local capabilities as well as the availability of materials and cost of transport.

Figure 9: Inputs into Rail Track Infrastructure



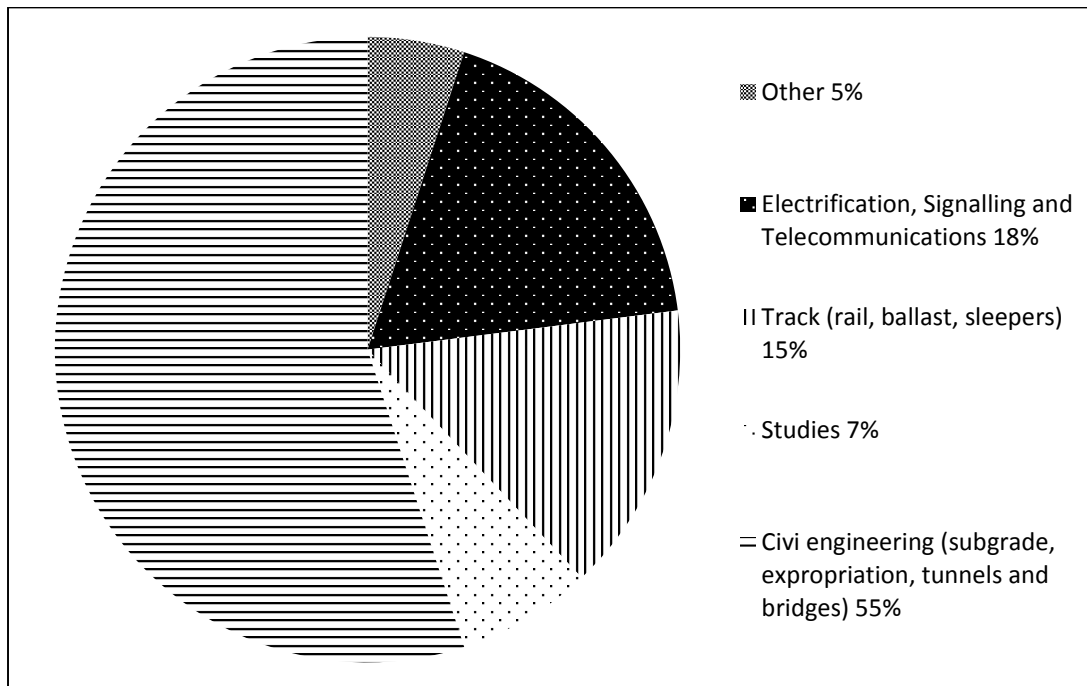
Source: World Bank (2011) *Railway reform toolkit: toolkit for Improving Rail Sector Performance*

Process of infrastructure construction and capabilities of key actors: the case of rail infrastructure

Generally the construction of rail just like any other infrastructure construction follows the Front End Loading (FEL) project cycle. The preliminary phase in the construction process is to follow governments' infrastructure development plan, which basically gives an outlay of government's plan about infrastructure construction in the country. Secondly there is need to know the land and environmental use licenses applicable.

The actual construction starts with engineering consultancy works undertaken by a rail-engineering consultant. The task entails conducting a feasibility study of how one can optimally design a rail line. The output from this process is a design of the project that is presented to the construction firm and should comply with the engineering specifications. This phase constitutes approximately 7 percent of the construction project (Figure 10). The largest proportion of the cost is the civil engineering which accounts for around 55% of a typical light railway line, followed by electrification, signaling & telecoms and the specific track related work.

Figure 10: Cost Breakdown of Typical Light Railway Line



Source: Andrade (2008) *Renewal decisions from a life cycle cost (LCC) Perspective in Railway Infrastructure – An integrative approach rail using separate LCC models for Rail and Ballast*

Railway track Construction

The actual construction starts with engineering consultancy works undertaken by a rail-engineering consultant. The task entails conducting a feasibility study of how one can optimally design a rail line. The output from this process is a design of the project that is presented to the construction firm and should comply with the engineering specifications. This phase constitutes approximately 7 percent of the construction project.

The main construction firm and subcontractors undertake the construction activities. The first set of construction activities is earthworks, which involves clearing the rail track and drainage using earthwork machinery. Sleepers are then laid down, rails are put on top of the sleepers and the track is ballasted by putting the ballast stone down. These tasks can be undertaken either fully mechanically through specialised plant and equipment (e.g. ballast tamping and stamping machines) or done by labour or a mix of labour and machinery and equipment. Once the track has been laid, track geometry is done and the rail track is completed by the erection of signaling equipment. After this stage we have the superstructure. Depending on the type of locomotives (i.e. diesel or electrifies) that will be used, line electrification will be done; but this process is generally expensive. However the process slightly differs when it is rehabilitating or maintaining an existing railway line, but the machinery used is basically the same as constructing a new line.

Diversion and realignment

This is a construction process done using earth moving machinery and rail construction machinery on an existing railway line to make the line more efficient i.e. increase the carrying capacity and or speed or stability of the line. This may be done by smoothing out the angles or slopes to flatten the line or by widening out the curves from for instance 200 to 400 meters radius. There may also be need for more passing loops to ensure that trains coming in the opposite direction can pass without having to wait for oncoming trains to pass.

Railway bridge construction

The process starts off with the design phase in which one considers all the factors that affect the forces and stresses that the structure will be under with the passage of trains. The first factor is the axle load of a train and the number of passes that a train makes in a period (i.e. the frequency). If the designer knows that the railway is for bulk materials such as coal then the designer must design a bridge that will withhold the stress of a minimum of a 30 axle train passing because that is the international maximum volume that the current coal train technology takes. However the design may also have to consider a bridge for the future to account for the upgrades in axle load technology and the carriage of other freight. Other stress factors are changing weather conditions which expand or contract the structure

The main inputs required for bridge construction are reinforcing steel and concrete. The contractor must first guarantee the stability of the structure. This is done by filling the steel cages implanted with concrete until the required height is reached. The structure will have steel stalks emerging from the concrete which are then covered to form the deck. Once the concrete has set, the contractor will incrementally launch the deck and then push it over the valley. The piles (reinforced pillars) are expanded upwards to secure the bridge.

4. Case study of Moatize

The Nacala and Sena lines linked to the Moatize coal project were found to be the only projects underway while the rest are still in the conceptual or negotiation stages, or tendering stages as discussed in section 3.2. It is therefore against this background that the study focuses on the Nacala and Sena line where construction and rehabilitation is already underway. This section identifies the activities or products and the lead firms that the study focuses on and to develop key questions for the study and set a plan for the investigation.

4.1 Construction activities cost breakdown

In order to identify the focus of our research by activities, we do a cost break down of the main infrastructure investment activities currently underway that are connected to the Moatize coal project. As discussed, Vale is the sponsor of the Nacala corridor and is financing the project to the tune of US\$3.9 billion. The project includes a railway component and a coal port terminal component. Moreover, the corridor has been split up into 8 sections with different contractors leading each portion. The data in our

possession provides a cost break down of 5 of the 8 sections on the railway line and the port terminal costs of the Nacala line, as the other 3 sections are still in good condition. Starting off with the railway components, the total costs of the 5 sections of the railway line amount to US\$2.937 billion (Table 7). The bulk of this work is apportioned to infrastructure construction and bridges (US\$1,241 billion). This figure includes actual construction services provided by the different contractors and the cost of the bridges. The second major cost item is labour, which amounts to US\$1,116 billion and is followed by diversion and realignment (US\$194 million), rails (US\$109 million), consulting engineering or oversight (US\$94 million) which covers prefeasibility and project management, sleepers and culverts (US\$87 million), superstructure (US\$50 million) and signaling equipment (US\$43 million). The other materials such as fixings and AMV are but a fraction of the total cost of the project.

Table 7: Nacala railway line Cost breakdown.

Material/Service	Value (US\$ Billion)	% of total cost
Infrastructure construction and bridges	1,241	42
Labour	1,116	38
Diversion and realignment	0,194	7
Rails	0,109	4
Oversight	0,94	3
Sleepers & culverts	0,87	3
Superstructure	0,50	1.5
Signaling	0,43	1.1
Fixings	0,2	0.1
AMV	0,1	0.03
Total Cost	2,937	100

Source:CFM

The total construction cost of the port of Nacala is US\$1.232 billion. This figure comprises the coal port terminal US\$1 billion (Table 8) financed by Vale and the port construction sponsored by JICA US\$232 million (Unfortunately we do not have access to the cost break down of the JICA sponsored port project). Turning to the coal terminal, the largest cost is labour, as it contributes over 50 percent of the total. The full cost of construction services is US\$255 million that is comprised of onshore construction (US\$181 million) and offshore construction (US\$74 million).

Table 8: Cost breakdown for Nacala Coal Terminal

Material/ Service	Value (US\$million)	% of total cost
Labour	507	50.7
Onshore Construction	181	18.1
Offshore Construction	74	7.4
Treadmill	65	6.5
Primary & secondary substation	60	6
Consulting engineering	49	4.9

Stackers and Reclaimers	28	2.8
Ship loader	25	2.5
Turner wagon	11	1.1
Total Value of Project	1000	100

Source: CFM

It therefore brings the total known cost of Sena and Nacala railway lines to US\$5.312 billion (i.e. Nacala US\$2.937 billion plus Sena US\$2.375 billion). The total cost of the port expansion projects is US\$1.232 billion. Together the rail and port cost is US\$6.544 billion across Nacala and Sena.

The cost break down analysis shows that there is more funding towards railway construction and rehabilitation than to port funding cost. The share of South African firms in this total is US\$243 million only for the Nacala line where data is available. Therefore the total value of rail projects underway have more potential impact on the local and regional economy than the port projects. The study therefore focus on railway rehabilitation and construction work in the Sena and Nacala lines given that that is where much of the funding is being directed.

The activities that have the highest financial value are:

- infrastructure construction and bridges
- diversion and realignment
- rails
- consulting engineering (oversight)
- sleepers and culverts
- superstructure and signaling equipment

In choosing where to prioritise the research, another key factor is the existing regional and local capabilities to make the products or render the service and the potential for creating these capabilities in the foreseeable future.

4.2 Existing and potential capabilities in South Africa and Mozambique

South Africa has the capacities and capabilities to produce all the products and render all the services required with a few exceptions such as the long-range rails and earth moving equipment, which are imported. There are also capability gaps in some rail construction machinery and signaling equipment. South Africa has capabilities to assemble signaling equipment and can make a limited number of medium tech components whilst it imports the value added high tech equipment. Lastly, South Africa has the capacities to make rails for sidings and crossing. The capabilities for the construction of long-range rails was eroded when Mittal closed the plant due to lack of investment from the then Spoornet.

Mozambique is in a very different position, with a much more limited set of capabilities (Table 9). Mozambique has local construction firms, but of a much smaller scale and at the level of subcontractors. There are also now production capabilities in sleeper and culvert manufacturing. The latter is a result of plants being established to respond

to the demand by Aveng, in February 2014 and by Wegh, an Italian company. Despite having set up the production facility there are still concerns with the quality of cement, a key raw material in the production process.

Table 9: Capabilities in Mozambique and South Africa for rail and related construction

Products/Services	Current		Possibilities	
	SA	Mozambique	SA	Mozambique
Construction and bridges	Yes.	Possibly at the subcontractor level	Existing	Yes. With training, heavy investments in machinery and equipment, and joint partnerships
Rail construction machinery equipment manufacturing and earth moving machines	Yes. 2 companies manufacture rail construction machinery at varying degrees of local content. Earthwork moving machines are imported	No.	Existing	No. Requires specialized skills, design, access to intellectual property.
Diversion & realignment	Yes	Possible?	Existing	Yes.
Rails	No. Capacity for rail for sidings but not long range rail.	No	Yes, but capacity and capabilities were eroded because the lack of demand didn't justify the investment	No. quantity are just not there.
Rail Consulting engineering	Yes	No.	Existing	No.
Sleepers & culverts	Yes	Yes.	Existing	Existing
Superstructure	Yes	Yes. But few	Existing	Existing but could be expanded
Signaling Equipment	Yes. Manufacture limited set of components which are assembled jointly with imported specialized components.	No	Low chance of increasing capabilities for specialized components.	No.

Source: Authors construction using interviews with firms

Each activity has a range of skills requirements from highly specialized to low-medium skills. The high skills are the rail engineers and industrial engineers, who are involved in construction, manufacturing of construction equipment and in design and project management. On the construction services side, these engineers would be supported by foremen who are technically trained to coordinate the teams and to manage the day-to-day operations. The labour or workers tend to require less technical skills although machine operators would require some certification to operate the machines. On the manufacturing side, the same tiers of skills are in operation - engineers, quality assures, and workers who would also require a degree of technical skills training for their work.

The boom in infrastructure being experienced in Mozambique creates the possibility of building capabilities across the two countries. Two areas in which South African

industry can benefit are rails and signaling equipment. While Mozambique is unlikely to establish such industrial production, there are large potential benefits from growing local construction capabilities, increased manufacture of construction products, such as cast concrete items, and training. The immediate impact will be felt at the lower skilled level while the highly specialized engineers' levels will take longer to build competencies. These services can be provided in a labour-intensive manner rather than a mechanized way in order to have maximum impact on labour and incomes. Influencing the behavior of large internationalised firms is crucial in this, through using different policy levers.

Taking these considerations into account, the study focuses on the following products and services based on value of the contract and capabilities approach:

- Construction and bridges, sleepers and culverts, and superstructure (capabilities in existence in South Africa and Mozambique, albeit at lower levels)
- Diversion and realignment (capabilities in existence in South Africa but not in Mozambique that Mozambique can build)
- Signaling equipment and rails (capabilities marginally in existence in South Africa but will not be in Mozambique in the foreseeable future)

5. Mozambique Infrastructure Procurement and Linkage Development Related Policy and Practice

An analysis of the Mozambican Procurement Policy Framework and its relationship with linkage development sets the context within which an analysis that evaluates the extent to which both local and regional capabilities are being built. The procurement policies of public (state) and private (Vale and donor) actors are analysed in order to derive a relationship between procurement policy and linkage development in infrastructure construction materials and services. These actors are selected on the basis of their involvement in financing the Nacala and Sena rail infrastructure projects. In each of the subsections, the policy frameworks of each of the actors are described followed by an analysis of the extent to which local linkage development is accounted for.

5.1 Public Policy and Policy Actors in Linkage Development in Mozambique's Construction Sector

Public procurement of public works, supply of goods and provision of services by government in Mozambique is guided by the provisions in Decree 15/2010 of May (ACIS, 2011). The regulation was introduced to update the previous procurement regulation of 2005 Decree 54/2005, with an aim of reducing the overlaps that existed among other challenges and to make it conform to international best practices. The regulation guides procurement for government public works, goods and services purchased by government at national, provincial, district, municipal and all state owned companies (ACIS, 2011). The regulation also covers procurement of any goods and services for government funded by donor governments. The Unit for the Supervision of Acquisitions (UFSA) is the government body responsible for the oversight of the procurement regulation. The application of the regulation requires that it comply with

the following principles of legality, proportionality, purpose, reasonableness, equality, competition, impartiality, good faith, stability, motivation, responsibility, good financial management and other public law principles.

The procurement legislation applies to three types of procurement namely: general, special and exceptional⁶. The general regime applies to the contracting of public works and supply of goods and services to the state known as public tender. The special regime allows for procurement processes that are different to the general regime which might be a result of an agreement between Mozambique and another state and a decision to adopt different procedures altogether by the contracting authority. Last, if there are further exceptions that require the contracting entity not to use the general regime they can apply the exceptional regime.

The modalities for contracting under this regime are the following; tender with pre-qualification, limited tender, two stages tender, tender by bids, small scale tender and direct contracting⁷. These are described in detail in table 10 below. The two stage and preferred bidder tender modalities are mostly likely to be pursued in civil construction due to the complexity of the projects which require a balance between a technical and price assessment. The bidding process follows standard international practice of bid preparation, announcement and evaluation as described in table 11. The table also describes the actors involved throughout the process. A key point to take from table 11 is that there is a clear focus in targeting nationals based on the manner in which information about the announcement is disseminated because tenders are announced in national media and are written in Portuguese.

Table 10: Description of Tender Modalities

Tender Modality	Description
Pre-qualification	Tendering process which is limited on participation, requiring only bidders who qualified on a preliminary phase to submit their proposals to participate ⁸ .
Limited tender	Is intended for small and medium enterprises, it is adopted either when the value of public works does not exceed MT3.5million (meticaïs) or supplying of goods and service that does not exceed MT1, 750million (meticaïs).
Two stage tender	Bidders offer at a technical proposal in the first stage in the evaluation phase and in the next stage a final technical proposal and price proposal ⁹ . This tendering procedure is used when the contracting entity is not capable of defining in a precise manner the technical specifications of the tender.
Small scale tender	Contracting that takes place when the price estimates is lower than 15 percent of the limit established in Limited tender discussed earlier and is restricted to micro and small enterprises ¹⁰ .
Direct contracting	Is applicable only when the service or good to be supplied can only be obtained from one single contractor or if the contractor previously contracted can undertake maintenance work of a similar standard. However the procedures for each type of tender basically follow the same procedure as in a general tender.

Source: ACIS 2011

⁶Procurement Regulation, Article 6.

⁷Procurement Regulation, Article 9.

⁸Procurement Regulation, Article 85, paragraph 1.

⁹Procurement Regulation, Article 94 paragraph 1.

¹⁰Procurement Regulation, Article 106.

Table 11: Description of Tender Process and Institutional Involvement and Role

Action	Tender Preparation	Announcement	Evaluation
Institutions	Executive Management Procurement Units (UGEADepartment	Executive Management Procurement Units (UGEADepartment	Tender Committee
Description	<p>a. Government Department intending to procure goods and services sends a request to the UGEA with the following information (technical specifications, the purpose of procurement, specific requirements that must be made of bidders and the estimated cost and budget provision).</p> <p>b. UGEA verifies and prepares tender document that must first be approved by requesting government department before advertising.</p>	<p>a. All tender documents are at the very minimum to be written in Portuguese</p> <p>b. National tenders must be announced twice in newspapers and also at the headquarters of the procuring department.</p> <p>c. International tenders must be published in the Republic Bulletin and or on internet page or by any other means.</p> <p>d. Published tender must contain the following; tender announcement, announcing that a tender will be held, invitation of bids from the public and awarding of the tender to the winning bidder.</p> <p>e. In the case of tenders for public works they must specifically indicate the classification of companies eligible for the project.</p>	<p>a. The committee is comprised of at least three members who are qualified to decide on the evaluation process and at least one of the three must be a civil servant linked to the UGEA</p> <p>b. The functions include opening tenders, requesting clarifications to tenderers on behalf of the procuring entity, seeking expert advice when necessary, evaluating and ranking proposals, proposing changes in the initial proposals in the case of two-stage tender and submitting evaluation report with a recommendation of the winner to the contracting entity</p> <p>c. The committee opens the bid in at a public meeting attended by the bidders and other interested parties. The public meeting proceed by identification of the tender process, reading of the list of bidders, opening of the bids, reading of the main contents of each bid (price offered, name of bidder, discounts being offered and the provisional guarantee), signature of each member of the jury and signing of the minutes of the meeting, which is done before meeting closure (ACIS, 2011). After the closure of the public meeting the bids are evaluated by Tender Committee in a closed door session based on the majority decision of the present members.</p>

Source: ACIS 2011

The extent to which local participation is regarded is made by analysing the criteria used to evaluate a winning bid. There are two ways a tender can be evaluated. The

first does not make considerations for local participation as it only takes into account the lowest price. When awarding a contract based on the lowest price, the proposal that guarantees the level of quality specified in the tender document at the lowest price is awarded the contract.

The second infuses price, quality, service and local content criteria. More specifically the following criteria may be added: transportation cost and insurance, schedules of payment, delivery deadline, equipment efficiency, operational costs, availability of replacement parts, training, warranty conditions, safety, environment benefits, qualifications of technical team and equipment and being a holder of a certificate 'Mozambican Pride- Made in Mozambique'¹¹.

The challenge with the above criteria is that the adoption of specific criteria such as 'Mozambican pride – Made in Mozambique' is at the discretion of the applicant. The consulting tender and evaluation is more specific about the elements that ought to be on the tender and the weightings that are to be allocated to each. These factors are listed below along with the points that are to be awarded out of a total of 100 (Table 12). The factors are a mix between technical parameters (such as consultant's experience, qualifications) and also local content (in the employment of Mozambican consultants and the knowledge transfer to Mozambicans). However, there are no specifications as to how knowledge transfer is measured, and local participation does not translate into the proportion of local value-added.

Table 12: Parameters considered and the points awarded for consulting services

Parameter	Points awarded
Consultant's experience	From 5 to 10 points
Methodology	From 20 to 50 points
Qualification of Key staff	From 30 to 60 points
Transfer of knowledge	From 0 to 15 points
Participation of national consultant	From 0 to 10 points

Source: ACIS 2011

Lastly, provisions are made to restrict participation based on nationality or preferential margins to national bidders or nationally produced goods. The preferential margin for public works is 10 percent of the pre-tax contract value and nationally produced goods are given 15 percent of the pre-tax value.

Given that firms operating over six months are obliged to register their companies, it is of interest to gauge the extent to which they are viewed as local Mozambican firms from the perspective of ascertaining whether or not they gain from preferential treatment. Nationality for natural persons is determined based on citizenship and for legal persons is based on "being legally incorporated and registered in Mozambique and having at least 50 percent of their social capital held by a natural person with Mozambican nationality or held by a legal person which itself has at least 50 percent of its social capital held by a natural person with Mozambican nationality". Therefore nationality in effect is determined based on citizenship and thus the preferential

¹¹Procurement Regulation, Article 37, paragraph 4

margins provisions would preclude foreign legal persons from obtaining preferential points.

The adoption of preferential margins is not only at the discretion of the applicant however the intent to apply such a margin is subject to the approval of the Ministry of Finance.

Participation in tendering is not only limited to local players, the regulation has provision on requirements that have to be met by foreign tenderers before tendering for work in Mozambique. Firstly the foreign participants are required to meet the basic requirements similar to national tenderers (we will not get into detail of the requirements for national tenderers for further information see Article 26 of the regulation). In addition to that the foreign tenderers are required to; have an agent in Mozambique with special powers to be served with a process and to respond according to law to the tenderer's acts, provide their legal financial and economic and technical qualification position in their home country, proof that they are not bankrupt in Mozambique and in the home country and submit all written documents required in Portuguese language.

To summarise, while price and quality are given more weight in the evaluation process, provisions are made for local participation. The strength of the state procurement framework in relation to linkage development is that it gives preference margins to local Mozambican firms. However its weakness is that its implementation is discretionary as there is no obligation on the part of the applicant to adopt preferential treatment.

5.2 Donor funded Public Infrastructure Projects: The Case¹² of, European Investment Bank and World Bank Sena Rail Corridor

The World Bank and the European Investment Bank (EIB) have been the central donors in the infrastructure rehabilitation of the Sena railway line and port infrastructure. The World Bank committed US\$110 million in 2004 for the rehabilitation of the Sena line, a project that was assessed as a qualified failure in 2011. Since then, the EIB has stepped in as the lead financier of a new tranche of financing for the project cost of the port and railway to the tune of US\$188.5 million. The project is being co-financed by the World Bank, CFM, the Danish Development Agency (Danida) and a grant from the Netherlands through Oret (the Development-Related Export Transactions Programme of the Directorate-General for International Cooperation of the Dutch Ministry of Foreign Affairs). This section analyses the procurement policies of the World Bank and EIB given their heavy involvement in financing the Sena Corridor.

An analysis of the donor agencies procurement policies reveals that they are designed in a manner that gives greater weighting to the participation and selection of global multinational firms in the procurement process. The rules bias the global participation of multinationals in two ways. Firstly donors' procurement guidelines strictly follow international competitive bidding processes through the publication of procurement

¹² This is of the total Sena line cost of US\$2.375 billion.

notices and pre-qualifying bids on their websites and across international media platforms. For the World Bank, projects in excess of US \$ 1 million for services and US \$ 500,000 for goods are restricted to international competitive bidding. Secondly, donors restrict the participation of firms that are not financially independent from the state such as state owned companies. This means that in a country that does not have large firms with the capabilities to compete with international firms, the state cannot leverage the resources that can be pulled from its state owned enterprises as a means of developing the local market.

The multinational participation bias could be counter weighted by the selection bias if the generic price and quality standards found in evaluation criteria that would bias internationally competitive multinational companies are accompanied by linkage development or local content policies in order to include and to build the capabilities of local firms. However, linkage development and local content policies, whilst contained in evaluation guidelines, are weak albeit in a less explicit manner than the participation bias (Table 13). The implicitness of the multinational selection bias is particularly true for the World Bank than it is for the EIB. The World Bank's localisation criteria allot points for knowledge transfer and the participation of national experts, which together with consultant experience, methodology and key experts, are part and parcel of the evaluation of quality. However knowledge transfer and the participation of national experts are not only given less points; since there is no measure for defining knowledge transfer, the inclusion of national experts and knowledge transfer could result in a firm claim on the localization points purely based on its hiring of national citizens in the project – a strategy that in most cases would have been used in order to exploit the national's local knowledge of the sector. Whilst this is viewed as positive and important, it only covers one dimension of localisation while disregards the importance of ensuring the value of production is localized.

Table 13: Quality Evaluation

Factor	Score range
Consultant experience	0-10
Methodology	20-50
Key experts	30-60
Transfer of Knowledge	0-10
Participation of national experts	0-10
Total	100

Source: World Bank (2014).

The EIB localisation criteria from this perspective is far stronger as borrowers may grant a 15 percent margin of preference for goods manufactured or produced in the country (defined as having at least a 30 percent local content ex-factory). The bidding documents must clearly indicate such preference. The comparison is then made between the price (net of taxes and duties at least a 30 % local content ex-factory) of the imported good increased by 15 percent and the price (net of taxes and duties at the place of delivery). Bidding documents must clearly indicate such preference. However, this preference system is only for manufactured goods and not locally produced services (such as consulting engineering, or civil construction works). The implication of omitting construction works in the case of infrastructure construction projects is that local capabilities have less chance of being developed in what is the

largest area of spend (the civil infrastructure construction, as seen from figure 11 in section 3.3.) of the infrastructure construction value chain.

An interview with a consultant that manages the World Bank's procurement process in Mozambique confirmed that the procurement process is designed to bias the selection of firms from industrialised countries or those with strong capabilities over concerns about building local capabilities. The consultant stressed that the practice is to prioritise price and quality in the evaluation of contracts while local content is not taken into account at all because the World Bank does not give differential treatment to foreign and local companies belonging to member states. The consultant raised the concern that the local Mozambican firms tend to lose out because the evaluation criteria consider experience as a factor, as illustrated in table 14. However this is a challenge that the interview highlighted which characterized the Bank's procurement policy throughout the least industrialised world. Since most local Mozambican firms lack experience and also given the weaknesses in the local content policies, they are in all likelihood to be excluded from the procurement process.

Table 14: Factors considered by World Bank when awarding contracts from 1 (not important) to 5 very important

Factors	Details
Cost	5
Quality	5
Lead times	5
Local content	0
Innovation capabilities	1
Capacity to provide full package (EPC)	0
Financing	5
Others	(3) They consider "professional ability" i.e. the assets of the bidding company such as equipment that they use to do the work. They also consider their ability to outsource such equipment if they do not have it on their disposal that is why it is not very important. (5) They consider health and safety policies of bidding companies. (5) Experience is an important factor considered to award the contract. Countries with a traceable experience on their line of work and working with the Bank are more likely to win.

Source: Authors construction using interviews with firms

5.3 Public and Private Sector Procurement Policies and Practices in Tendering and Linkage Development

Vale and CFM are the sponsors of the rehabilitation and expansion project of the Nacala Corridor. The corridor was originally divided up into 8 sections, these sections

comprised of various alternative routes to the Port of Nacala from Moatize. The route has now been rationalised to consist of seven sections and the concession for each of these sections is controlled by different companies. The table below illustrates the name of the companies, the sections the companies managed and the equity partners for each of the companies. It is clear from the distribution of equity, that effectively Vale is the main owner of each of the companies and thus the concession (Vale has a controlling share of approximately 70 percent) and CFM has a significant share across the companies too (Table 15). An important partner to the agreement is the 10 percent stake that has been allotted to Insitec, a financial group with links to the former President of Mozambique.

Table 15: Nacala Corridor - Equity Distribution

Concessionaire Company	Section	Equity Distribution
CLN	2, 8, 9	Cfm (20%) and Vale (80%)
VLL	3	Vale (100%)
CEAR	5	CFM (49%) and Vale (51%)
CDN	6 and 7	Cfm (49%) Vale (51%)

Source: Authors construction using interviews with firms

The shareholder agreement that Vale and CFM entered into has given Vale the responsibility of leveraging its capital base to raise the finance required for the works, this also includes raising finance for CFMs shares too. Therefore CFM is indebted to Vale and will repay its share of the concession after 12 years once the line has earned enough revenue. The repayment terms of the agreement in terms of the interest payable were not given, however since Vale's borrowed commercially these are likely to be substantially above the donor interest rate.

Governance of Procurement

A Special Purpose Vehicle (SPV) called SDEICN was created to manage the construction, procurement and the finances on behalf of each of the four concession companies. The SPV stakeholders are comprised of Vale, CFM and the market (i.e. Insetec). The board of directors' of the SPV comprises of three individuals from Vale and two individuals from CFM. The staff compliment of the SPV is 120.

The SPV is governed by a management contract that states amongst other things the procurement rules that are to be followed for the purchase of goods and services. These rules detail how goods and services must be procured and the extent to which the SPV can make procurement decisions vis-à-vis the concession company. The SPV has established a procurement forum that is responsible for formulating, advertising and evaluating the tender. Most of the technicians are from Vale because CFM lacks capacity. The SPV through the procurement forum recommends to the relevant concessionaire company the companies that are best suited for the works. The decision ultimately rests with the concessioning companies because they finance the projects. Vale is apparently not the only actor that makes procurement decisions, CFM is also a key stakeholder in the procurement process. However, given the distribution

of ownership and the volume of technical staff, it is also clear that Vale has more decision-making.

Procurement Process

Vale has mapped the supply chain for its project or activities in a manner that it deems ensures local participation while price and quality factors are not compromised. This principle has seen it categorise its supply chain into three groups, namely: global, national and local. The supply chain for the goods and services required had then been mapped in order to identify the service providers that can be categorised under each group.

The global category denotes goods and services that are purchased globally because they are key technologically intensive inputs or are complex activities that require an international sourcing platform to acquire them competitively. Construction activities are part of this group.

The national category is for goods and services that can be purchased within the country from firms that are registered as Mozambican entities. The local category denotes goods and services that are owned by national citizens through a 51 percent share and are procured locally. These tend to be small and medium size companies that the company procures such services as cleaning and maintenance services, hotel services.

The evaluation process is designed in such a manner that biases the participation and selection of multinational firms. Multinational firms benefit from participation bias in two ways. Firstly the procurement of infrastructure construction is done under the global category and as discussed above this means that global participation is pursued in the purchase of infrastructure construction works, services and goods. Secondly, the SPV draws from its vendors list, which comprises of service providers who either by invitation or by application have been pre-qualified. Those firms that are invited onto the list are generally firms that have worked with Vale such as the Brazilian construction company Odebrecht or are well known to provide the goods and services.

Multinational selection bias is engendered as the evaluation of infrastructure projects does not give a weight to local content as it is procured under the global category. This bias is depicted by the factors that are considered by the company when awarding contracts. Information gathered through interview with the company shows that more weight is given to competitiveness factors such as price, logistics, quality and experience when awarding a contract in infrastructure projects this would clearly favour multinational firms that have the capabilities to meet these requirements. Local content is also viewed as important, however this depends on the category under which the good or service is being evaluated. If the good or service is being evaluated under the local category then local content is important but if the good or service is being evaluated under the global category then it is less important. Note that private advertisement is done irrespective of Mozambique's procurement legislation that states that projects above a certain threshold must go through a public tender. Since CFM, represents government in the partnership, it is clear that Vale's procurement practices have a greater bearing on procurement processes than that of CFMs.

According to interviews, government has not developed any linkage development programme that will help to foster the transfer of technical skills and knowledge between foreign multinationals and domestic enterprise. Thus far, only discussions have been held between industry players and government. Vale argues that local content that is being done is being done through its own initiatives as fostering local content is amongst one of its core principles. These initiatives have led to the increase in its expenditure in Mozambique towards the economy. Vale estimates, that 74 percent of the firm's procurement expenditure was sourced through the Mozambican economy in 2013. However only 30 percent of this expenditure was sourced from the local category i.e. Mozambican nationals, meaning that local participation is still low. The following subsection discusses the state of Mozambique's linkage development programme.

5.4 Investment Promotion and Linkage Development

This section analyses the investment promotion initiatives that are being taken by the Mozambican government through its various institutions that it has created in order to promote linkage development and local participation in the country. The government agencies involved in linkage development are the Institute for Promoting of Micro, Small and Medium Enterprises (IPEME) and Centro de Promocao de Investimentos (Investment Promotion Center) (CPI). Industry is represented by the Confederação das Associações Económicas de Mozambique (Confederation of Economic Associations of Mozambique) (CTA). We analyse how these institutions have been able to deliver on their mandate in relation to linkage development drawing from the interviews conducted with the institutions.

The Institute for Promoting of Micro, Small and Medium Enterprises (IPEME) is responsible for assisting small and medium business in Mozambique. It falls under the Ministry of Planning and Development. It has four division namely; Director, Internal Service, Technical development and Productivity and Marketing and organization. The technical development and productivity division assist small companies through training on business and project management. The institution also undertakes studies that analyze opportunities and constraints faced by local small and medium enterprises (SMEs) operating in Mozambique. IPEME is currently involved in the following sectors; agribusiness, construction, fishing, services, transport, packaging and oil. The institution has developed strategies for all sectors except for the construction. The strategy for each sector basically shows the plan of the institutions towards assisting small and medium enterprises operating in that particular sector. The reason why they do not have a strategy for the construction sector is due to lack of skills and experience in the sector required to formulate a strategy. The absence of a strategy for the construction sector is cited by the institution as a big limitation towards achieving its role of assisting small and medium enterprises operating in the sector.

CTA is a business association organization that represents all the business associations in Mozambique. It advocates for relaxing of regulation and policy issues with government that restrict investment. CTA currently have ten working groups on the following areas, agribusiness, tourism, construction, transport, mineral resource, gas and petroleum and other cross cutting issues such as fiscal reform, international

trade and security. It is currently advocating for government to put in place laws that give preference to local companies in public tenders. Mozambique has a law which gives preference to domestic firms but does not enforce the client to use local firms. This is also being pushed by the Federation of Construction which is advocating for government to award more tenders to local firms.

One of the challenges that the institution indicated was that when government partners with foreign firms in the form of a Public Private Partnership, usually foreign firms compel government to follow their procurement procedures, which in many cases do not benefit local players. The CTA has been instrumental in pushing for Rio Tinto to establish a training center in Mozambique which was successful. However, despite their efforts in pushing for the establishment of the training center, the requirement for local firms to qualify for training at the institution are very hard to meet. Despite the institution registering some progress in pursuing its mandate, it has failed to resolve its annual 100 issues on its own agenda which require negotiation with government. This has been mainly due to lack of annual work plan to implement its agenda. The institution's work is further limited by the lack of political will to support its proposed policy changes. The institution also lacks capacity in terms of expertise and human resources to undertake their work. All these challenges amount to limiting the organization to perform its advocacy role.

Investment Promotion Center (CPI) is an institution, which was set up to assist in attracting investment into the country. CPI offers the following services; institutional assistance to investors in the approval and implementation of investment projects; ensuring that investors get access to fiscal incentives provided by law for the establishment of their projects, promotion of business linkages between domestic and foreign companies, SMEs and large enterprises; Identifying potential financial partners and or technology for the establishment of joint ventures; Identifying and disseminating investment opportunities. The organization is thus a one stop shop for assisting investors to get approval from various government ministries before they set up their businesses. The organization has four departments namely, information and marketing, business development, business linkage department and project management. CPI's business linkage department's aim is to link small and medium enterprises which are not participating with large businesses. It also work with the Ministry of Trade and CTA in order to pursue their objective of ensuring small firms participate in the economy.

CPI recently signed a memorandum of understanding with IPEME to assist in financing local small and medium companies. Although it appears that CPI is the only institution with a clear mandate on business linkage development, they lack finance to help small business. Their role is then limited to providing contacts and setting a database for small enterprises to connect with big clients and become part of the large supply chain. There is also no impetus for companies to engage in local capabilities development. Table 16 summaries the mandate, linkage policy instruments and target group of the institutions.

Table 16: Institutions responsible for investment promotion and linkage development

Organization	Organisation Type	Mandate	Linkage Policy Instruments	Target group
Institute for Promoting of Micro, Small and Medium Enterprises (IPEME)	Small and Medium enterprises	The aim of the institute is to; Formulate new policies that support the growth of SMEs, Assistances with training of SMEs and Manage the SMEs database for Mozambique.	They have sector strategies but these do not contain any instruments for linkage development	All small and medium enterprises operating in Mozambique.
Confederação das Associações Económicas de Mozambique (CTA)	Business Association	Create a network that influence economic and sectoral policies and to ensure the competitiveness and business quality, promote private ownership and investment, generate employment and contribute to the production of wealth; strengthening the associative movement, extending the basis of representativeness and the quality of their work; collaborating actively with all partners to remove barriers to the free development of business and entrepreneurial activities. They also discuss regulation and policy issues with government that constraint investors with an aim of relaxing some of the regulations in order to attract more investment into the country.	None	All business associations operating in Mozambique.
Investment Promotion Center / Centro de Promocao de Investimentos (CPI)	Investment Promotion	Expand domestic and foreign direct investment; Promote innovation in the economy; improve the country's economic competitiveness; increase GDP growth rate; increase job opportunities; improve balance of payments; increase of the number of tax payers and tax revenues; development of infrastructures and facilitation of the development of SMEs, through inclusive joint ventures, and private public partnerships with nationals active participation.	SPX business linkage department. Has a	All investors willing to invest in the country.

Source: Authors construction using interviews with firms

Much of the interaction that investment promotion does with industry is investment facilitation rather than linkage development. This is because although there is a department, it does not have instruments and the finance to actually implement linkage development. IPEME is a similar case to the investment promotion center discussed earlier. The institution is there to develop these linkages with industry, it has a strategy however the strategy merely states the intentions to develop linkages but it does not say anything about how this is to be achieved. While the institution has a strategy for other sectors(such as agro-processing, tourism) it does not have a strategy for the construction sector nor does it have a sector desk or staff working in developing the construction sector. This is despite the fact that there is an increasing awareness of its importance due to the construction boom currently being witnessed in the country. The lack of direction and financing for linkage development facing the government agencies speaks volumes about the level at which political elites have prioritized learning to improve productivity in local Mozambican enterprises. Their institutional role has been limited to merely facilitating entry and exit into the market through the issuance of licenses and other regulatory verifications required while building

capabilities has been ignored. This state of affairs is echoed by CTA's prognosis of the challenges facing business operating in Mozambique. The institution highlights that there is lack of a coherent strategy and activism on the part of the state. This is due to, inconsistency of government regulations, lack of shared vision and overarching policy for business environment and the resistance among functionaries who benefit from the existing system. Moreover government does not have technical capacity to assess the impact of private sector proposals.

This is further worsened by the fact that there is lack of policy support that compels foreign investors to participate in developing local capabilities. Mozambique is currently establishing a local content policy that started in 2014. However despite the efforts to create a local content policy, the current challenge is firstly that the policy is not supported by law; secondly there is a problem with tied aid from donors that results in the policy not being enforced in such circumstances as the donors come up with their own procurement guidelines as part of funding conditions, which will not necessarily recognize local content. Essentially, the policy environment in Mozambique has not developed such that bureaucratic institutions mandated to champion linkage development indeed carry out their mandate. Instead the bureaucratic machinery has been used to facilitate these linkages with foreign investors by way of facilitating the establishment of their operations. The causes of this cannot be fully addressed in this report due to limitations in the fieldwork and access to information. The next sections discuss the outcomes of the lack of policy support by analysing the performance of South Africa, foreign and local Mozambican firms.

6. The structure of Mozambique's Construction Value Chain

Following Mozambique's independence in 1975, the Mozambican government through the Ministry of Public Works nationalised the Portuguese privately owned construction firms and material suppliers, creating state owned companies in the civil and heavy construction sector (Sutton 2013). The sector has expanded and receded at various points since independence. The end of the civil war in 1992 was followed by government expenditure on major construction and rehabilitation work of roads, railways and harbours. The post war boom in construction soon receded as the economy fell into depression only to resume once more in recent years as a consequence of the commodity boom. The recent construction boom has expanded the number of domestic and foreign firms operational in Mozambique. This section characterises the South African, local Mozambican and to a lesser extent foreign firms operational in Mozambique that have managed to penetrate the market that were interviewed for the study in order to understand the structure of the Mozambican construction value chain (section 6.1). This is followed by a comparative analysis of the strategies used by South African, other foreign firms to enter the Mozambican infrastructure market given the procurement and operating environment (section 6.2). Lastly it analyses the opportunities and challenges faced by local Mozambican firms in entering the rail infrastructure market (section 6.3).

6.1 Structure of Mozambique's Civil Construction Sector

The Mozambican construction value chain has become increasingly competitive. This section unpacks the structure of the Mozambican civil construction sector. The discussion characterises the origins of firms that have entered the market and also characterises the local Mozambican market.

Mozambique has an estimated 2,490 construction companies among whom include big, medium sized and small companies. Contractors operating in Mozambique must obtain a license with the Ministry of Public Works. These companies are graded according to their capital and human resources which is a litmus test meant to determine their ability to undertake different projects of varying complexity and scope. There are seven grades and the depth of their expertise and capital increases incrementally from one to seven. As shown in the table 17, grade one is the lowest grade with very low minimal capital requirement and human resources and thus these firms tend to do menial work and the range improves to grade seven which has the most depth by way of minimal requirement for human resources and capital.

The majority of local Mozambican firms fall in the range between the first and fourth grade with the third grade having the largest concentration. Distinguishing between foreign and local Mozambican firms is very difficult as many of the foreign firms registered in Mozambique have taken up Portuguese names. However an interview with an official from the department of public works confirmed that the majority of foreign firms are located in the seventh grade while the local Mozambican presence in that grade is small in comparison. The significance of this finding for our study is the fact that the firms that have the ability to undertake large complex projects are those in the seventh grade and thus this will most likely be a firm that is foreign in origin.

Table 17: Classification of construction companies and minimum capital requirement

Class	# of firms	Maximum value per class 000' Meitcas	Minimum capital requirement 000' Meitcas	Permanent technical team
1	156	350	20	1 civil builder
2	248	850	50	1 civil builder with five years' experience
3	1283	2500	150	1 mid-level engineer and 1 civil builder
4	314	5000	500	1 engineer or architect and 1 mid-level engineer
5	226	15000	1500	2 engineers or 1 engineer and 1 architect or 1 engineer to 2 mid-level engineers
6	49	50000	5000	3 engineers and 1 mid-level engineer or 2 engineers, 1 architect and 1 mid-level engineer
7	214	Over 50000	10000	5 engineers and 2 mid-level engineer or 3 engineers, 1 architect and 2 mid-level engineers with more than 5 years' experience

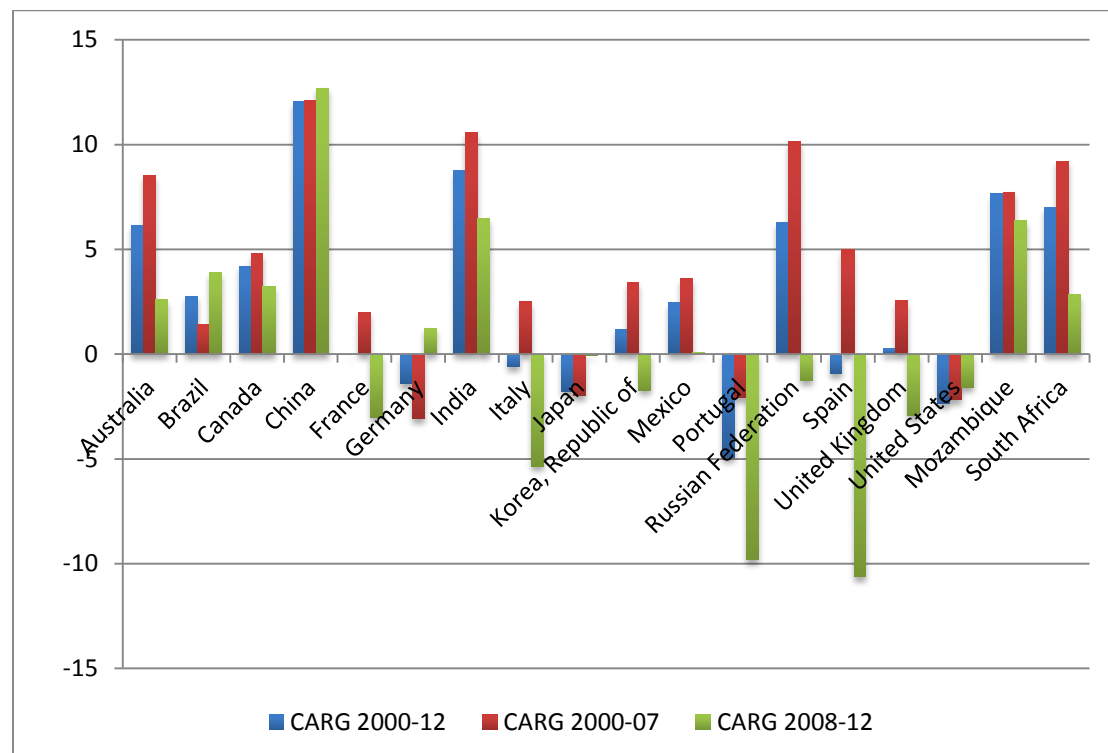
Source: Sutton (2013), Republic de Mozambique (2008)

Historically local Mozambican, South African, Portuguese and Italian firms populated the civil construction sector with a presence in Mozambique that spans between 10 to 20 years. In many ways, the foreign established firms can be said to have become indigenised, as most local Mozambican firms interviewed saw them as local Mozambican firms. The largest construction firm in Mozambique is an Italian multinational, CMC, however this firm is viewed as a local Mozambican firm, thereby enjoying the same treatment as locally owned Mozambican firms when tendering for work despite it being multinational.

However a new crop of firms has emerged in the last five years adding to pricing pressures and the scope of work on offer. These firms are new entry Portuguese, Spanish, Brazilian, Chinese, Indian and South African contractors. Taking advantage of market opportunities in the Mozambique construction sector is but one of three motivations for the entry of these firms. The other two can be categorised as the motivation to survive while the other is the motivation to entrench and grow their value chain.

New entrant firms motivated by the need to survive have entered the Mozambican market as a consequence of the poor performance of construction activity in their home countries. These firms are mostly from Portugal, Spain and South Africa. The poor performance of these countries since the economic crisis, particularly for Portuguese and Spanish firms, is clearly marked in figure 12. The figure describes the compound annualised growth rates over 10 years and also before and after the crisis for countries that contribute the most to global construction value added and countries of interest (Portugal, Mozambique and South Africa). On the flip side are countries that have shown growth post crisis such as Brazil, China, India and Mozambique. Brazil, China and India's entry into Mozambique is motivated by the need to entrench and grow their value chain as firms from their countries are heavily invested in Mozambique's mineral extractive industries. In addition, the presence of Chinese firms is also motivated by the Chinese government's policy of exporting a surplus construction sector to developing countries through state financed construction projects as spelt out in the Forum On China-Africa Cooperation (FOCAC).

Figure 11: Annualised Compound Growth Rate of Construction Value Added, by Country and period



Source: UNCTAD database, 2014

Turning to the local Mozambican firms interviewed, it is observed in some way that they too are amongst the new crop of firms that has emerged over the last 5 years given their years of establishment. This is the case for all except for two of the firms interviewed which have a longer history. Some of the owners of these firms had gained experience with the larger international firms and decided to open up their own business. In spite of their grade 7 status, the sizes of these firms in terms of work undertaken is very small when compared to the more established firms depicted in figure 12, with one local Mozambican and Portuguese owned firm. This gives us insights about the extent to which they will be able to be absorbed in a mega infrastructure project. Note also that there is no preference for locally-owned firms, as the critical issue is whether the firm has a registered Mozambican corporate entity.

All the locally owned Mozambican construction firms interviewed do not have cross border operations, as their strategy is insular in nature as they try to build their domestic presence. Government is the main client for all the firms interviewed. The range of government construction projects undertaken by the firms is hospitals,

schools to roads and bridges. Only one of the firms interviewed had experience working on a rail infrastructure project.

Figure 12: Interviewed Firms Characteristics



Source: Authors construction

The South African domiciled firms that are able to penetrate the Mozambican infrastructure construction value chain tend to be large multinationals with a strong domestic base. The majority of firms are concentrated in small-scale construction projects and are local Mozambican; while few firms are located in the large-scale market segments, and are comprised by local Mozambican firms and on the main foreign firms. The next section analyses the strategies employed to enter the Mozambican infrastructure construction value chain.

6.2 Regional vs Global Responsiveness to Mozambique's rail infrastructure demands: A Case of South Africa, Chinese, Portuguese and Italian firms

The Mozambican civil construction sector was characterised as open and competitive market with a strong foreign component. This section compares the regional (i.e. South Africa) versus global firms (i.e. Chinese, Portuguese and Italian) responsiveness to Mozambique's rail infrastructure demands. We first outline the winners of the Nacala and Sena line contracts and then analyse the corporate strategies used by firms from South Africa, China, Brazil and Portugal in order to access the market for rail infrastructure projects.

Listed in table 18 is the population of firms and their origins that have been identified through interviews, media reports and documents as being active in the Nacala and Sena rail infrastructure project. Tier 1 firms are those with the main contracts in the project and are involved in specialised engineering and construction and rehabilitation services such as oversight or project management, rail track construction, bridges construction and diversion and realignment. Tier 2 firms are component manufactures involved in sleepers and culverts, signaling and rails. Only one tier 2 specialised construction firm was identified as it has been subcontracted by the main contractors on the job.

The absence of local Mozambican firms as lead construction and consulting engineering firms is clearly evident from Table 18 below. All the firms are foreign. Tier 1 firms come from South Africa, Portugal, Brazil and Australia. The Australian firm listed is domiciled in South Africa, therefore it is amongst the foreign firms located in South Africa using the country as a regional base through which to enter the rest of the region. Tier 2 firms are also foreign coming from Japan, United Kingdom, South Africa and Italy.

Table 18: Companies operating in construction of the Nacala and Sena lines

Infrastructure construction & bridges	Home Country	Tiers
Aveng Lennings Railway Services	South Africa	1
Mota-Engil	Portugal	1
Samaque	Brazil	1
OAS	Brazil	1
Superstructure		
Aveng Lennings Railway Services	South Africa	1
CR2OG		1
Rails		1
Nippon Steel	Japan	2
Sleepers and Culverts		

Wegh	Italy	2
Infraset	South Africa	2
Signaling		
Ivensys	United Kingdom	2
Oversight/Consulting engineering		
SRK	South Africa	1
Worley Parsons	Australia (South African domiciled)	1
Diversion and realignment		
CR2OG		1
Bridges		
Soares da Costa	Brazil	1
Sena Line		
Rehabilitation Services		
Mota-Engil	Portugal	1
Grindrod Rail (Subcontract)	South Africa	2
Visabeira	Portugal	1

Source: Authors construction using interviews with firms

Clients' expectations of the contractors to whom they award contracts are instrumental in shaping the competitive dynamics in the market. Table 19 highlights the factors that clients in South Africa and Mozambique take into consideration when awarding a contract according to firm interviews in order of importance (i.e. very important, important and not important). It is clear that price, quality and lead/delivery times are very important to clients in South Africa and Mozambique. Local supplier development is not important in Mozambique where as it is very important in South Africa.

According to the firms interviewed financing is important in so far as it proves to client that the firm in question has the financial depth to meet the project requirements. And the ability to provide EPC or design and build capabilities is the least important. However in assessing the importance of finance and EPC in Mozambique, one has to consider the fact that the firms tender for projects that are already being financed by a sponsor (usually a private client) that elects to work with a consulting engineer and thus follows a traditional client driven civil contracting procurement strategy. For some this is linked to not having financing capabilities, while in other cases linked to the fact that they have not pursued this strategy in Mozambique specifically although they have in other parts of SADC. South African domiciled firms reported a preference for private clients over government clients in Mozambique due to perceived role of political interests in government contracts. Moreover private clients are also global firms that operate along similar corporate governance standards. Therefore this does not mean that the market for project initiation by design and build contractors for infrastructure does not exist in Mozambique as is the case in South Africa. Chinese firms have been the most successful in entering the market by financing the projects they eventually design and build in transaction linked to mineral exploitation.

The importance of aftermarket service provision and innovation capabilities to clients varies depending on the activity of the firm along the value chain. Suppliers of machinery equipment observed that the ability to provide aftermarket service for the

purchase or lease of machinery equipment has in recent years become an important consideration for clients in the region as they realize that infrastructure facilities for repairs, maintenance and spare parts are essential for their competitiveness. Therefore aftermarket sales are a core capability for machinery suppliers along the value chain such as earth moving equipment, signalling equipment and rail yard equipment supplies. Machinery suppliers also note that large multinational clients tend to be sophisticated purchasers of equipment since some of the contracts may be in the range of multi billions of Rands. Moreover there is associated customization to project specification.

Table 19: Clients in South Africa and Mozambique According to Firms

	Price		Quality		Lead/delivery times		Aftermarket Services		Innovation		Capacity for EPC		Financing		Local Supplier	
	Mo	SA	Mo	SA	Mo	SA	Mo	SA	Mo	SA	Mo	SA	Mo	SA	Mo	SA
Consulting Engineers	3	3	3	3	3	3	1	1	1	1	1	1	3	3	3	1
Civil Contractors	3	3	3	3	3	3	1	1	1	1	1	1	3	3	3	1
Earth moving/yard machinery	3	2	3	3	3	3	3	3	3	3	1	1	1	1	3	1
Rail engineering	3	3	3	3	3	2	1	1	1	1	1	1	3	3	3	2
Track products	3	3	3	3	3		1	1	1	1	1	1	3	3	3	1

Source: Authors construction using interviews with firms. **Note:** 3 means very important; 2 means important and 1 means not important

In addition to clients' expectations, firms must also contend with Mozambique's challenging business-operating environment namely – technical skills, input access, language, regulations and customs. Generally, firms interviewed (aside from two civil contractor firms) reported that Mozambique had a limited pool of artisanal and technical skills from which to draw. A strategy is to rely on expats particularly at the more technical levels, however gaining work permits is a constraint and also government procurement rules even on donor funded projects specify the use of local labour through quotas. On the other hand this could act as an incentive for the firms to train workers not only at lower levels and artisans but also at the hire more technically and managerially intensive levels. The two civil contractor firms that did not experience a skills challenge in Mozambique note that this is due to the fact that their employment strategy is geared towards employing diverse nationalities that can be deployed as it suits the working conditions of their operating environment which enhances the management of the workforce.

Mozambique suffers from shortages of key inputs as a result of the limitations in its industrial base which affects price competitiveness and lead times. Consequently, few purchases are made in Mozambique as firms in the rail construction value chain prefer to import their supplies directly from South Africa or from other cheaper and high quality sources or purchases in Mozambique through local distributors that import from South Africa, China, India and Pakistan. More specifically, inputs that are purchased

in Mozambique from local producers are cement, concrete products, sands and aggregates, while spare parts, earth moving equipment and steel products are either purchased through distributors that import them from abroad or the firms directly import them. The duty structure for construction materials seems to recognize the inability of the domestic industry to produce construction materials. This is reflected by low average tariffs of between 2.5% and 7.5% for cement and steel products imported under the Most Favoured Nation (GoM, 2012)

Consequently, the price of inputs is extremely high in Mozambique driving up the cost of construction. Rail engineering firms noted that prices are 60 percent higher and rail track suppliers claimed that costs were 20 percent higher when compared to South Africa. Firms also complained about the quality of the local cement which they found to be of low strength and consistency as compared to imported cement.

Majority of consulting and civil engineering firms interviewed in South Africa¹³ reported that language is a challenge especially when dealing with tenders and managing staff. Firms that did not find this a challenge have had an established practice of employing expats from a variety of countries including Mozambique and thus found it easier to localize their operations in Mozambique drawing from their Mozambican expat pool of employees.

Regulatory barriers are also a challenge in the form of customs and work permit delays, employment quotas and the repatriation of profits and VAT¹⁴. Delays at customs were rife and temporal imports to facilitate the entry of machinery and equipment adds to the logistic cost. While there are zero duties on temporary imports, firms still must pay VAT especially when their projects exceed the six months temporary import period. Firms noted that processes for repatriating profits and VAT were complex to understand and cumbersome. The expectation of filling employment quotas for government projects was according to the firms a challenge because Mozambique did not have the skills required by the firms; these skills would be filled by expats but work permits made it difficult to recruit expats.

How then do market participants across the construction value chain respond to client expectations and the business environment? Table 20 compares by order of importance the South African domiciled firm strategies to those strategies deployed by new entrant firms and established firms from countries that dominated the interviews conducted with South African domiciled firms. These results would have to be triangulated with interviews from competitor foreign firms to limit bias.

Table 20: Strategies Used to Facilitate Market Entry in Mozambique

Strategy	China	SA	Est. Portuguese & Italian	New Portuguese /Spanish
Price below cost	3	1	1	3
Project completion	3	3	3	1
Low cost inputs	3	2	2	2
Client Networks	3	3	3	3

¹³ See Appendix 3 for the list of firms interviewed in South Africa.

¹⁴ Consulting engineering firms did not complain about customs delays as they do not conduct any importation.

Project Finance	3	1	1	1
Strong coord of supply chain	3	3	3	1

Source: Authors construction using interviews with firms. Note: 3 means very important; 2 means important and 1 means not important

A competitive pricing strategy was highlighted as a very important attribute for a tender in the procurement policies analysed in section 5 and in interviews held with clients and firms. The entrance of Chinese State Owned contractors has added to pricing pressures. These contractors use cheaper inputs (particularly poor quality plant and machinery, cement etc) and are heavily subsidised by the state. Other pricing pressures are coming from Portuguese and Spanish firms that have recently entered the market out of desperation as some are facing bankruptcy or are at near bankruptcy due to the European crisis. A consequence is that they have been pursuing an aggressive pricing strategy, under-pricing projects in order to secure projects to cross subsidise operations in Europe. However information gathered from interviews show that these companies are associated with high degrees of project failure as they have not been able to complete projects. Project failure has also been amplified by the inability of these firms to organise their supply chain in keeping with the tough operating conditions in Mozambique where there is lack of supply of key inputs.

South African firms that have managed to counterweight these dynamics have done so by completing projects on time at the highest level of quality and service by implementing zero claim policies. Often times, South African companies have been called upon to complete projects that have been abandoned or have been ill constructed by these firms. Quality workmanship has earned South African firms the respect of clients given their solid track record and reputation. However these are firms that have been operating in Mozambique for some time and have experience in the continent therefore use their knowledge of logistical difficulties of coordinating the supply chains in remote isolated parts of the region as a competitive advantage. Two South African firms that are relatively new to Mozambique, face the same steep learning curve that other new foreign entrants particularly European firms operating in Mozambique face. They have admitted that they are less timely in project delivery and quality is affected by the fact that they have not developed strong capabilities required to coordinate their supply chain. A South African civil contractor that has been the most successful at penetrating the region noted that an important factor that has worked as a competitive advantage is an employment policy that attracts a diverse multicultural work force. This has enabled them to pull and mobilise their ready established human resources from Mozambique to their Mozambican projects.

Chinese firms have been the best able to coordinate their supply chain. This is because they are vertically integrated state owned firms (i.e. they have integrated construction materials and civil capabilities) with access to cheap inputs that are imported from China, a consequence of the excess supply in the construction sector that facilitated the country's long run industrial expansion. Established Portuguese and Italian firms also exercise strong coordination of the supply chain, establishing procurement companies in South Africa that facilitates their access to competitively priced inputs.

Another way in which strong coordination is reflected in the Foreign Direct Investment that has been made by South African, Portuguese and Italian firms in parts of the value

chain. These firms have chosen to invest in segments of the value chain for which capabilities can be easily built and for which lower transportation costs enhances competitiveness. This is reflected in Box 1 below, as diversified construction groups with manufacturing capabilities in heavy low cost precast concrete products have made investments in Mozambique and elsewhere in the region to serve the Mozambican market.

Box 1. Mozambique's Industrialisation through Regional Direct Investment: The Case of Concrete Products

One of the firms interviewed was a South African concrete pipes manufacture which is part of a large, multinational and diversified South African construction firm. Its products are used in infrastructure projects are range from railway sleepers, pipes, culverts, retaining blocks, paving and pre-stressed poles used for electrification. The firm has been in the business for the last 54 years and has supplied over 20 million railway sleepers in South Africa, Zambia, Zimbabwe, Mozambique and Namibia and has set up manufacturing factories in Zambia, Zimbabwe, Swaziland and most recently Mozambique.

The South African market for its products has decreased and is being outpaced by the rest of the southern Africa. Mozambique and Zambia have grown rapidly in recent years. The revenues generated by Mozambique and Zambia are estimated at US\$ 11 million per year a piece which is double the South African market. In Mozambique, the firms main competitors are the Portuguese firm Motta-Engil, which imports from its Malawi factory and Wegh, an Italian firm with a plant in Mozambique, which is an a joint venture with the largest civil contract in Mozambique CMC, an Italian firm with many years operating in Mozambique.

The firm has been exporting sleepers into Mozambique from its Swaziland factory for the last 15 years. This changed in February 2014 after it opened a US\$ 120 million factory in Tete. The firm was not only encouraged to invest in the factory by the Mozambican government's business incentive; however the investment was also a competitive strategy that would help to better coordinate its supply chain in the face of stiff competition, especially because the material produced is heavy and thus transport costs for delivery are high. The firm is in negotiations with CFM in a joint venture to refurbish a factory in Dondo which produced poor quality sleepers for the Sena line which lasted 5 years instead of the standard 50 years.

The factory currently employs 75 local Mozambicans and one South African expat. The South African Office trained Mozambican workers for two months empowering them with skills to operate the machines before the company opened its Tete factory. They also offer local training programs for their staff in their Offices around the region. The company highlighted that they currently do not have any local training in Mozambique offered through partnerships with local educational institutions but they highlighted the possibility of setting up a Technikon or partnerships with local educational institutions in Mozambique if business keeps on increasing. However in South Africa they support Technikons where they train their staff and also sponsor students studying in Universities at any particular year. Their factory is also involved in subcontracting for minor maintenance work of its plant and equipment making use of small engineering firms such as Kemp Engineering for its factory in Tete.

Source: Authors construction using interviews with firms

However the firms interviewed argue that the emphasis on low input cost is done without compromising on the quality of the inputs in order to deliver a quality project unlike the Chinese model of pursuing low input costs. These companies either import their inputs from South Africa or from China, Pakistan and India depending on cost and quality. The Chinese low input cost model is most pronounced in the earthmoving equipment segments of the value chain since the equipment is cheap and there are no infrastructure facilities to cater to client needs such as: repair and maintenance and spare part sales. South African firms have placed emphasis on skills training to improve their local work force in Mozambique. This is either facilitated by on the job training or through training at South African institutions.

The establishment of strong relationships with clients was identified as an important strategy. Strong client relationships facilitate the dissemination of information of upcoming projects and create the opportunity for repeat work. There is a large degree of informality in nurturing these relationships, as they are not formalised into long term-exclusive right contracts as clients tend to be spoilt for choice. Firms from different countries adopt different strategies to nurture these relationships as a means of creating opportunity for further work. Portuguese firms are able to use their historical connections to Mozambique and in Brazilian firms as reflected with interviews with Vale as part of a Brazilian value chain of relationships which are facilitated with by the Brazilian sponsor of the mining project – Vale. According to interviews, Chinese firms armed with their financing package strategy tend to use government-to-government bilateral negotiations as a means of nurturing client relations. Crucially, it is the Chinese government's strategy to develop its financing packages for construction projects in Lusophone countries through the Island Macau. Macau is a former Portuguese colony which was returned to China and thus has Portuguese speaking Chinese, who are used to enter lusophone countries.

First tier domiciled South African firms (i.e. consulting engineers) are the main gateway of entry for the second tier South African domiciled firms (i.e. track product producers and civil contractors) as discussed below. The large multinational consulting engineering companies interviewed based in South Africa generally have their origins in the United Kingdom, United States of America and Australia and have offices all around the world. All aside from one have entered South Africa by acquiring established local South African consulting engineering firms. The strategy has been used to use South Africa as a regional base from which to expand their footprint across the African continent where they have opened offices too. Their global presence means that their branches around the world have worked with global private clients particularly in the extractive industry such as Vale and Sasol in their operations in other parts of the world. This experience and relationship is then used to gain entry into other markets where these global clients have established new operations such as Mozambique.

Second tier South African domiciled firm nurture their relationship with these consulting firms because a) they have information on upcoming projects as they are the first contractor the client approaches and hire in the conceptual phase of the project which helps them to prepare for tenders and b) they have a degree of influence on the decisions taken by the client on whom to contract for the construction phase of the project. It is not uncommon for consulting engineers to recommend contractors and materials suppliers that they have worked with in the past, especially those that they have worked with in the prefeasibility phase of the project. However, the recommendation must be factually based on the competencies of the contractor and the consulting engineer must demonstrate these competencies to client.

This section found that there is a strong foreign presence in Mozambique's rail infrastructure projects. At one level, the penetration of these foreign firms is as a result of their capabilities in managing complex projects. Specifically South African firms capabilities are demonstrated by their project delivery, quality, strong coordination, experience operating in the region and competitive price. However capabilities are not the only measure of success, the networks within which these firms operate are

important too. These networks depend on the nature of infrastructure financing as this influences the procurement strategy pursued and thus the networks are either firm based (South Africa), nationality based (China and Brazil) or historical and cultural ties (Portuguese). Whilst there is strong regionalisation, localisation is none existent the next subsection discusses some of the reasons for this tendency.

6.3 Mozambique's Local Civil Construction Capabilities and Responsiveness to rail infrastructure demands

A key insight from the previous discussion is that local civil construction capabilities do not have a foot in rail infrastructure projects. These projects are dominated by Portuguese, Brazilian, South African and Chinese firms. An analysis of client expectations and the strategies employed by firms to meet these expectations was discussed. This section will attempt to understand why local Mozambican firms do not enter into this segment.

All but one of the firms interviewed have not been involved in rail infrastructure projects. Their lack of involvement is not necessarily due to them not possessing the requisite capabilities to do the civil work required of a rail infrastructure project. The firms are involved in various building and infrastructure projects such as roads, schools, hospitals, factories, bridges and culverts. The skills involved in such projects like earth works, foundations, electrical etc. are transferable in the civil works for a rail infrastructure project.

The procurement strategies used by the main financing agents (private mining firm and donor agencies) of the major infrastructure projects are amongst the key factors explaining the reasons why local Mozambican civil contractors are precluded from these projects. Section 5 highlighted possible participation and selection biases that may favour the involvement of multinational firms. These included: global sourcing, cost, financial and experience or track record.

The requirement of a long track record of experience and the lack of financial depth are, according to the firms interviewed, amongst the main reasons that undermines their ability to win major contracts rather than their cost competitiveness. Firstly, tender evaluations have on occasion proven some of the firms interviewed more cost competitive, but it is their limited track record that counts against them. Their limited track record stems from the fact that many of these firms have recently entered the market, some of whom having been employed in the very international firms they now compete with. Secondly, some firms are sub contracted to do the work by the major foreign firms who win the major projects (on account of their track record, networks and financial depth) in order to minimize the cost.

The localization of government procurement could be used as a stepping stone which enables the firms to gain the necessary experience or track record that can make it easier for them to get involved in the mega infrastructure projects. However, each of the firms interviewed lamented that localization is not a factor considered in the government procurement process; with one mentioning that local content is not pursued as projects are mainly funded by donors who impose their own rules that the

government has to follow in spite of there being a preference system in the government legislation.

The lack of financial means to obtain a bank guarantee required by the major projects is an obstacle as Mozambique's capital markets are underdeveloped and interest rates are exceptionally high. Firms rely on their internal resources to finance their projects, but for some firms even these come under pressure due to government client's delayed payments. The financing challenge was echoed at the FME third Gala event held on the 25th of August 2014. The audience witnessed the signing of a protocol between government and the bank BCI. The Bank's CEO announced that the protocol aims to "end the suffering of [Mozambican] construction companies" by facilitating the financing of local construction firms. Only time will tell whether this initiative will have the intended impact.

Another challenge is that the mega infrastructure projects, rail being one, are too big in scope for the local Mozambican contractor to swallow in spite of the grade 7 status. The firms also do not have the international best practice health and safety standards that large multinational firms require.¹⁵ If projects could be broken down into parts then local Mozambican firms in the 7th grade could take them on.

One firm interviewed, the only one from our sample that has prior experience in rail infrastructure projects, argued that in spite of its vast experience in civil construction accumulated over a 20-year period, its involvement on working on a major contract financed by a mining multinational company gave it exposure that it would not have obtained otherwise. The firm's insertion into a mega project as detailed in the quote below did not come with ease as it had to navigate a procurement system that favours the firms established networks, which are foreign in content. In spite of its experience and that its amongst the largest construction firms in the country, it was through its persistence, that it entered the network taking up menial jobs in order to gain the trust of the multinational for larger projects that reflect its competencies.

"What I can tell, we have started with the sales was 10 million dollars but now the equivalent of USD 14 million we grow a lot, but our first contract with a big mega project was Mozal in 2002. It wasn't a big contract, but let's say it was 3 million dollars but it gave us the idea of the high standards of international health and safety because we were dealing with a global mining house. All the firms that are in natural resources have very high standards of health and safety. It helped to build the management of contractual issues that natural resource firms asks for. Then we move to Sasol which is again not a big contract also roads and offices this gave us additional capabilities. It was not really technical skills because we had those,

The contract with Mozal was like cleaning your house, it was a small contract of US \$ 2 million. Clean here, put water here, and then more and more they started giving more work. And then they started trusting and giving us opportunities. Because these big companies they don't mind to have locals, they just don't have the time to procure locals, and then if your persistence then you will enter. We were very persistent because our involvement was before [the] Mozlink [linkage development programme]."

¹⁵ Interview with respondent from one of the largest local Mozambican construction firms.

The supply chain coordination challenge looms larger for local Mozambican construction firms than South African construction firms as discussed earlier. The firms have similar complaints: chronic shortages or high prices of crucial materials (machinery and equipment, cement, and steel), and others complain of the poor quality in the local cement. The cement problem is further worsened by the fact that government has put in place a requirement in the tendering process that forces contractors working on its project to use cement produced locally.¹⁶ This is enforced through a requirement to use cement of quality 32mpa which is only produced by Cementos de Mozambique, the state owned company that is co-owned by Insitec.

The companies highlighted that this is despite the fact that cement from South Africa and other deep sea import sources was cheaper and of better quality. Local Mozambican firms are less able to coordinate their supply chain because the supply chain is characterised by a system to access inputs such as cement wherein larger more established firms are catered to first, perhaps as a result of the magnitude of their demand. This is more pronounced in cement and machinery and equipment as shortages are more acute. These dynamics in the supply chain undermines their competitiveness as they will have the tendency towards longer lead times, which mars their ability to win contracts. Lastly the coordination failures are more pronounced outside of Maputo, where implements and inputs are less available and, if they are, it is at a very high cost.

6.4 Linkage development: Mozambique's experiences from Mozal Project

Linkage development has been one of Mozambique's policy instruments to ensure maximum benefit from foreign investment. The year 1998 presented Mozambique with a record US\$2.2 billion foreign direct investment in the Mozal project (Robbins *et al*, 2009). This section analyses Mozambique's past experience of mega projects in developing local capabilities using the Mozal project as a case study of the outcomes from policy intervention to capitalise on foreign direct investment.

The Mozal project was set up by foreign investors to produce aluminium for sale in the export market mainly in Europe and Asia (Castel-Branco, 2004). The project involved two phases namely, Mozal I which was the construction of the plant and Mozal II, for the expansion of the plant (Castel-Branco and Goldin, 2003). The size of the Mozal project created a vast amount of opportunities in the Mozambican economy particularly in sectors that supported the project such as infrastructure covering roads, electricity, communication and water provision (Robbins *et al*, 2009). Government of Mozambique has been at the forefront of encouraging the development of domestic industry linkages to such investments. The idea of promoting linkage development between multinational companies and local SMEs was conceived by government between 1997 and 1998 in order to get the most out of foreign direct investment (Robbins *et al*, 2009).

The linkage programmes for the Mozal project have been implemented in two phases (Robbins *et al*, 2009). The first was for Mozal I on construction phase, the CPI and

¹⁶ Interviews with firms.

International Finance Corporation (IFC) initiated the programme with support from Mozal and developed the Small and Medium Enterprise Empowerment Linkage Programme (SMEELP) (Castel-Branco and Goldin 2003). The SMEELP programme selected contract packages which were unbundled and only shortlisted for Mozambican SMEs (Goldin, 2004). The programme also trained small businesses on how to tender for project, managing contracts and marketing their business among others. A survey done by Castel Branco and Goldin, (2003) shows that 88% of the firms interviewed were of the view that the SMEELP programme was very useful. Training was done for small firms, leading to some firms winning contracts with Mozal (Castel-Branco and Goldin, 2003). Thus the SMEELP programme provided small businesses with the much needed expertise required to run successful business and experience of working with big projects and big companies.

The second phase of the linkage programmes were implemented by Mozal, the Mozlink I and II linkage programmes again with the support of CPI and IFC (Robbins et al, 2009). The motive behind Mozlink I was to create real and continuing linkages with the rest of the economy (Robbins et al, 2009). The focus on creating wider economic linkages was driven by the observation that development can be attained through Mozal given the previous success of SMEELP. The motive behind Mozal's participation was the need to create a local supply base to ensure quick delivery times and also for public relation purposes. While Mozilink was created from the success of SMEELP, it was different in that it involved other companies which included CDM, Coca Cola, EDM and Sasol (Robbins et al, 2009). The effect of having more companies was that it meant more markets for the small business enterprises. The Mozilink II linkage programme now involved the same aspects of Mozilink I but in addition the companies made financial contributions which were to be channelled towards training SMEs including using professional consultants to train SMEs (Robbins et al, 2009).

The impact of the Mozal linkage programmes has attracted wide attention among scholars (Castel-Branco and Goldin 2003; Castel-Branco, 2004; Robbins et al, 2009; Goldin, 2004). The literature comes to the conclusion that there have been both positive and negative effects that has come out of the linkages programme. On the one hand, the linkage programme led to training of SMEs, upgrading of SMEs as they sought to match the quality standards of Mozal, reputation effect (which led to more work coming from other clients to companies that participated in Mozal project) and SMEs got the experience of supplying large international firms with strict quality controls and delivery times. On other hand, the project presented in some instances large contracts that SMEs could not bid for as they lacked the finance and expertise to execute the work, there was failure by Mozambican firms to meet the required quality standards and personnel to deliver the work, the programme gave more training as opposed to more financial support which was needed by the majority of the firms and there was failure to create downstream linkage firms that utilised the raw material produced by Mozal.

The Mozal linkage development programme presented above shows a number of lessons for developing linkages. First, success attained was built on the current existing capabilities of local firms. This was then supported by policy in the form of SMEELP and Mozlink to encourage their participation in the project. Second, the

failures highlight the importance of directing policy to the right size of firms which can participate in building local linkages in mega projects. Mega projects usually involve the participation of big international companies which come with high standards and business ethics which often results in small businesses failing to meet them and thereby being excluded. Therefore developing linkages on these projects require firms with the potential and capacity to quickly adapt to such conditions. Third, it is important to note that Mozal played a very important role in developing local linkages. There was willingness on the part of Mozal to participate in the development of local linkages which was reflected by their quest to develop local suppliers. Last, the involvement of government also played a very crucial role in ensuring that linkages are developed through CPI.

7. Critical Review of South Africa's Rail Linkage Development Policy – Lessons for Mozambique?

Public procurement is being used as an instrument that leverages the state's buying power to boost local production and to broaden the participation of historically disadvantaged individuals. A number of instruments have been coordinated to develop industrial capabilities particularly in infrastructure development projects to stimulate the industrialization process. The Department of Trade and Industry's Industrial Policy and Action Plan (IPAP) as well as the Department of Public Enterprise have been at the for front of developing policy tools that are used to develop industrial capabilities particularly in infrastructure development projects. How these instruments have been used to build the industrial capabilities along the value chain is the subject of this section.

Table 21: Linkage Development Tools

Programme	Description
National Industrial Participation Programme	<p>The Industrial Participation is a programme that seeks to leverage economic benefits and support the development of South African industry by effectively utilizing the instrument of government procurement. The NIP programme is mandatory on all government and parastatal purchases or lease contracts (goods and services) with an imported content equal to or exceeding US\$10 million.</p> <p>The programme is targeted at the South African industries, enterprises, and suppliers of goods and services to government / parastatals, where the imported content of such goods and services equals to or exceed US\$10 million. The first customer of NIP is the South African industry that benefit through the NIP business plans which, when implemented generate new or additional business activities through one or more of the following: investment, export opportunities, job creation, increased local sales, SMME and BEE promotion, R & D and technology transfer. The second customer of NIP is the foreign suppliers who benefit from the programme through increased participation in the South African economy.</p>

	<p>In the case of foreign customers, the imported content of the purchase or lease contract for goods and services must equal to or exceeding US\$10 million to qualify for participation. In the case of South African industries, participation is dependent on enterprise capability to satisfy the requirements of both the IP programme and the foreign supplier.</p>
Designation Programme	<p>The revised Preferential Procurement Policy Framework Act (PPPFA) regulations which came into effect on the 7 December 2011 empower the Department of Trade and Industry (the dti) to designate industries, sectors and sub-sectors for local production at a specified level of local content.</p> <p>The following industries, sectors and sub-sectors have so far been designated for local production with minimum local content thresholds. Buses, textile, clothing, leather and footwear, steel power pylons, canned processed vegetables, pharmaceutical products, rail rolling stock, set top boxes, furniture products, residential electricity meters and working vessels/boats .</p>
Competitive Supplier Development Programme	<p>The programme leverages the procurement policies of Transnet and Eskom to develop local supplier capabilities. Demand side measures entail a) the SOEs supplier development plans which identify items for which local supply could be expanded or developed or improved, and for setting targets in this regard; and b) the use of planning, specification, procurement and strategic sourcing by SOE as instruments to achieve the targets in the supplier development plans and to create a conducive environment for the development of local supply networks. The supply side measures mobilising and providing support to the supplier industries targeted in the supplier development plans, to assist them to develop the capacity and capability to respond competitively to the SOE demand.</p>

Source: DTI and Department of Public Enterprises Websites

7.1 Outcomes of Rail Linkage Development

A distinguishing characteristic separating South African clients from Mozambican clients is the former's emphasis on local supply chain development as one of the important factors considered when awarding a contract. Government clients such as Prasa and Transnet tend to be more concerned about local supply chain development. The interviews reflect that the government's local supply chain development procurement strategy has been so effective, that it has had a cascading impact

throughout the value chain. To a relatively limited degree, firms that do not directly render goods and services to the state but rather render them to firms that directly supply the state are also prioritising localisation of their supply chain in segments of the chain with buyer power.

Illustrated in figure 13 is the sectors along the value chain that directly and indirectly supply the state with goods and services. All of the firms interviewed from sectors that directly supply the state attested to the fact that local supply chain development is considered as an important factor for the award of a government contract. Some firms from civil engineering, rail engineering and rail yard machines made the explicit point that government local content policy has affected their supply chain decisions as they are increasingly “passing down the buck” by prioritising local suppliers where possible, particularly in steel fabricated and component products where some capacity exists.

Figure 13: Sectors directly and indirectly supply the state



Source: Authors Construction

Indications particularly from the earth moving equipment suppliers interviewed show that local content to a certain degree is being considered.

There are two outcomes of the local content policy observed from interviews held with machine and equipment firms. The first is a gradual move by importers of completely built machinery and equipment used in construction towards importing parts for local assembly. This was observed in interviews with three importers of machinery and equipment, namely: a rail engineering track layer, a rail yard machine supplier and an earth moving equipment supplier. All except the rail engineering track layer reported that since the local content policy came into effect, measures have been put in place to increase local content where possible. The build-up in local content was found to be feasible in the assembly of their imported machinery and equipment (see Box 2 and Box 3).

Box 2. From Pure Importation to Assembly: Rail yard manufacture

One of the firms interviewed is a supplier of rail yard equipment. The firm is an agent to an international railroad equipment manufacturing company based in the US which has 240 outlets worldwide. The South African subsidiary reports to the German branch. The firm supplies railway depot equipment, purway machines and railway recovery machines. They also represent other international suppliers of railway recovery machineries in South Africa for re-railing equipment which include Kirro cranes used to lift derailed trains which is an important part of the business.

The equipment is very capital intensive and the company noted that the market for Kirro cranes is growing rapidly in the African market. Railway depot equipment include wheel drop set, coach and locomotives synchronised jacks, chassis rotators capable of lifting locomotives which weighs between 80-100 tonnes, railway inflow lifting systems, turntables, among others. Depot equipment is basically permanent and includes equipment to lift trains for undertaking the maintenance work.

In South Africa their equipment is found in all major railway depots and the most visible equipment they sell are synchronised lifting jacks for lifting locomotives undergoing maintenance and for manufacturing facilities. With the current investment by Transnet in the rehabilitation of rail equipment and infrastructure the company has experienced a marked increase in business due to this development. For the purway business or railway system which is the actual infrastructure on which the train runs, the company supply maintenance tools and they represent Robel in South Africa, which has a comprehensive respected range of track tools which include: rail cutters, rail drawls, tamping machines, welding machines and rail inspection machines.

The company's major clients are Transnet and PRASA and private railway operators in South Africa. Other clients in Southern Africa include CFM in Mozambique, Namibia Railway and DRC and the company also supplies machines through local distributors in other countries who import from them. The firm's involvement in Mozambique spans 8-10 years. The firm has supplied depot and purway tooling in Maputo, Beira and in Moatize through subcontractors. The firm regards Mozambique as one of its major market for its equipment. Entry into the Mozambican market was by invitation from clients due to the specialized equipment that they offer which is not supplied by many companies and they have established working relationship with their clients.

The firm mostly imports the majority of its machines from Germany as the local South African operation does not have the engineering capabilities and market size to localise production. However as a result of the government's localisation programme, the company has started to localise the assembly of its machinery. The firm is also in the process of ramping up its localisation programme by investing capacity and capabilities that will see to the localization of the body of the rail road equipment (which uses structural steel), while the electronics or technology will be imported from Germany.

Box 3. From Pure Importation to Assembly: Earth moving Equipment supplier

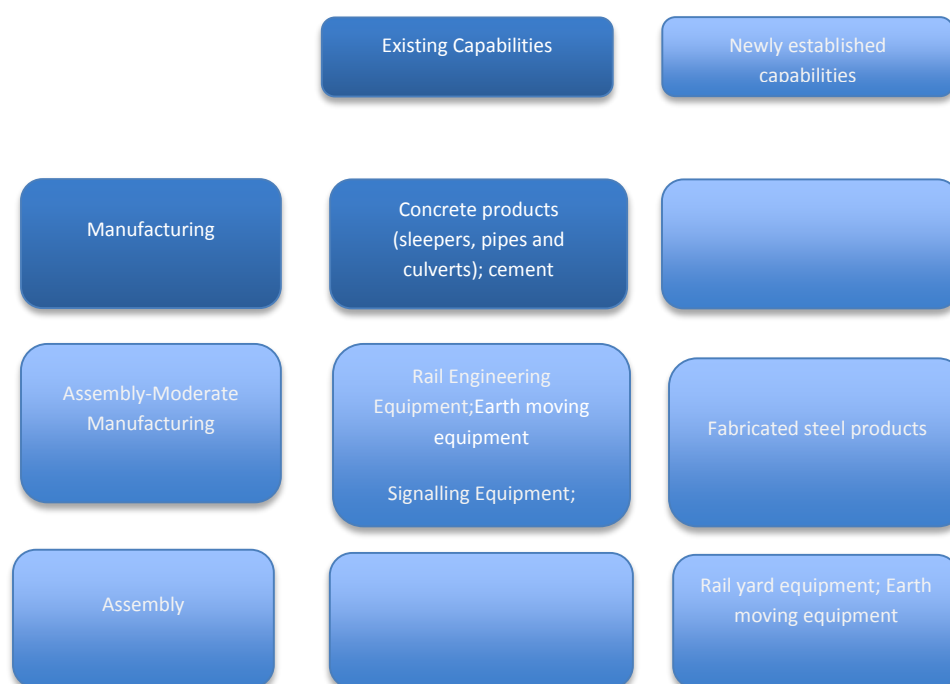
Interviews were held with one of the largest earth moving equipment suppliers on the continent, a multinational firm listed on the Johannesburg Stock Exchange. The firm distributes the following brands Metso Minerals Mobile mining, Construction crushing screening, Sitech, Avis, Toyota and MAK Perkins Diesel Engines. The firm provides maintenance support for the machines it sells through the sale of spares and components, training their client's machine operators and artisans to operate and conduct the servicing of the machine. For the construction industry their machines are mainly used in material handling, earthworks and road construction.

The firm's operations are dotted all over Southern Africa in South Africa, Angola, Botswana, Namibia, Lesotho, Swaziland, DRC, Malawi and Mozambique. The firm's branches distribute earthmoving machines, power systems and related mining and construction machines. The firm has operated in Mozambique since the 1980s and it has established distributorship offices in Maputo and Tete. The firm imports its machinery from Europe. However, because of the country's local content policy it has begun to assemble the imported completely knocked down kits at its workshop in South Africa.

Source: Authors construction using interviews with firms

Another finding of the research related to the impact of local content policy on supply chain decisions is that there has been a failure for existing assemblers and manufactures within the value chain to intensify local content towards building deeper manufacturing capabilities. This is illustrated in figure 14 below which depicts existing sectoral capabilities and those that are newly established as a result of local content policy.

Figure 14: Existing and Newly Established Capabilities



Source: Authors construction using findings from interview questions that attempted to ascertain the activities that each of the firm engage in and the sources of their key input supplies.

The figure demonstrates that existing pure manufacturing capabilities are limited to products that have lower value added (such as concrete products, cement and fabricated steel products), whilst the country has existing assembly to moderate manufacturing capabilities in higher value added products (such as rail engineering equipment, signaling equipment and earth moving equipment) albeit limited to a few firms. In addition, despite the fact that firms in the latter category conduct their own research and development to supplement the R&D with international firms with whom they have technological partnerships; key high tech inputs, such as electronics, engines and hydraulics are imported, while manufacturing is generally limited to steel structures and components that form the body of the equipment. The figure also demonstrates that local content policy has been more effective in building new pure assembly (rail yard equipment and earth moving equipment) and assembly to moderate manufacturing capabilities (fabricated steel products) than it has been in building manufacturing products.

Pushing beyond the current technological frontier is limited by one main fact: domestic and regional demand growth has historically not been strong and persistent enough to warrant the establishment of high value added machinery equipment capabilities. The limitations of growing these capabilities are made even more stark by the fact that the machinery equipment used in the railway infrastructure construction value chain is generally highly specialised therefore has limited uses and is also highly capital intensive. Consequently, global production of this equipment is limited to a few firms that are mainly based in Europe, the US and Japan, where domestic demand for railway maintenance is fairly high.

8. Conclusion and Recommendations

There are three main actors responsible for rail infrastructure provision in Mozambique: donors, mining and the state. Procurement Policy Frameworks designed and coordinated by each of these actors were analysed in order to gauge the extent to which they factor in the building of local capabilities through local content policy or local linkage development policy as part of their procurement process.

The analysis of the state's procurement framework revealed that while price and quality are given credence in the evaluation process, provisions are made for local participation, which gives preference margins to local Mozambican firms. The effectiveness of this tool is limited by the fact that its implementation is discretionary as there are no obligations on the part of the applicant to adopt preferential treatment.

The analysis also revealed that donor and PPP procurement policies have inherent selection and participation biases that favour the inclusion of multinational companies while local Mozambican firms are less likely to participate. These biases manifest in a variety of ways discussed, but at the center is the fact that procurement policies do not factor in provisions that help to build local capabilities through local content policies; rather emphasis is placed on price, quality and experience. These biases are more pronounced in private sector driven PPP procurement policy practices due to the closed nature of the process and the reliance on established networks and partnerships which are inherently multinational in content.

The absence of linkage development provisions in procurement policies reveals the state of industrial policy both in text and in practice. Investment promotion policies can be instrumental in encouraging learning particularly in Mozambique given the involvement of foreign investment in infrastructure provision and in mining. However, investment policy and its institutional apparatus has solely focused on investment facilitation and has neglected linkage development. Bureaucratic institutions charged with linkage development have been unable to carry out their mandate due to the absence of strategic direction, human and financial resources. There is a natural tension between interests in increasing local production and those that are linked to import and distribution of products for construction.

The majority of South African firms reported shortages of critical skills particularly technical skills and key input requirements due to the limitations of the Mozambican industrial base. The key input requirements along the rail infrastructure construction value chain consist of construction materials (i.e. cement, concrete products, aggregates, reinforcing and structural steel) and machinery and equipment supplies (particularly earth moving equipment). These materials aside from cement (which is generally locally purchased although of poor quality) are either indirectly imported through local distributors or directly imported from South Africa and other cheaper sources (i.e. India, China and Pakistan). However, the analysis also revealed that there are also regulatory barriers that make the operating environment challenging. Key amongst these barriers are a) the associated bureaucratic red tape found in customs and home affairs, which delays the importation of goods and work permits and b) the challenges in repatriation of profits and VAT. Consequently, the price of goods and

services in Mozambique is substantially higher due to the shortages of key input requirements and the regulatory constraints. However, these could also act as an incentive to build capacity in local construction materials and local skills.

There is a clear indication of regionalisation taking place in Mozambique's rail infrastructure construction sector by virtue of the presence of South African domiciled firms in the major rail infrastructure projects. What is also clear is that the continuation of this process is only *partially* based on the competitiveness of South African domiciled firms relative to other foreign competitors. This is true from the standpoint that competitive factors or capabilities, such as price, quality, delivery and experience, are key in determining the firms that eventually participate. The continuation of regionalisation is also contingent on the nature of infrastructure financing as this sets the tone for the procurement strategy pursued. This is because in spite of the fact that the infrastructure project is being implemented in partnership with the state through a PPP arrangement, Mozambique's procurement legislation is such that the ultimate decision maker in the procurement process is the main sponsor. Consequently, while traditional donor (e.g. World Bank, IFC, IEB) sponsored procurement practices aim to achieve competitiveness, it remains uncertain whether or not private and foreign state sponsored infrastructure projects will take into consideration competitiveness or nationality defined networks or a combination of the two in their procurement practices. For instance, the Nacala rail infrastructure case study showed that procurement practices are guided by a combination of competitiveness and national networks as Vale relies on its network of Brazilian firms while it also pursues a global sourcing strategy. On the other hand it is also true that Chinese sponsored projects have a tendency of only being open to Chinese firms. Therefore, further regionalization through private and state sponsored infrastructure projects under the current state will be determined by the whims of these actors' procurement practices.

As predicted the procurement environment favours foreign multinational companies as the evidence shows that there are no local Mozambican firms participating in the case study projects. The competitive strategies exercised by regional multinationals and those from China, Portugal, Italy, Brazil in response to procurement practices and business operating environment are the following:

- a) Competitive price but not at the expense of quality workmanship and high completion rates. This is in contrast to the new coming Portuguese firms that pursued aggressive price which in the end became an unsustainable strategy as it was at the expense of quality and completion.
- b) Strong coordination of the supply chain both through its organisation and access to competitively priced inputs is critical in construction activity, but more so in Mozambique as there is a systemic lack of availability in the supply of construction materials and services. Chinese firms have been able to pursue this because they are vertically integrated with access to cheap inputs imported from China. South African and established Portuguese and Italian firms also follow a strong coordination of the supply chain and low cost input strategy.

- c) The establishment of strong relationships with clients was identified as an important strategy. It facilitates the dissemination of information of upcoming projects and create the opportunity for repeat work. Chinese, Brazilian and Indian firms, particularly civil contractor firms, are best able to exploit these relationships as they part of or have strong links to the sponsors of the infrastructure projects as they originate from these countries. This means that these firms tend to know in advance the upcoming projects and are thus able to prepare themselves. From the case studies, Brazilian firms' advantages are best reflected in the Vale sponsored Nacala rail project. South African firm's second best strategy is to rely on the presence of firms that they have previously worked with that have been able to gain entry for information on new or upcoming project.
- d) Skills development is also central due to local employment quotas and the improvements required in Mozambique's skills base. South African firms generally invest in on the job training and in some instances make use of South Africa's vocational and technical training institutions and at times universities to train their work force. Mozambican firms mostly rely on the job skills training.

The procurement strategies used links with the financing agents. Private mining firms and donor agencies of the major infrastructure projects were found to be amongst the key factors explaining the reasons why local Mozambican civil contractors were precluded from these projects. The multinational participation and selection biases that colour the procurement regime are not necessarily driven by price competitiveness issues but rather by:

- a) the long track record, which is difficult for the local firms to fulfill because at least those interviewed are newly established firms
- b) financial depth required for a mega project, which is difficult to come by as due to the poor capital markets and the firms lack of reputation and,
- c) mere size of the project, which packaged too big for the firms to swallow in spite of their seventh grade status.

Moreover, the competitiveness of the local Mozambican civil contracting firms is further hampered by an operating environment that places them at an even greater disadvantage than the multinational firms. The local Mozambican firms have similar complaints as the South African firms, namely – chronic shortages and high prices of crucial materials (machinery and equipment, cement and steel) and poor quality of local cement. However the supply chain coordination challenge looms larger for local Mozambican firms because the supply chain is characterised by a queuing system wherein larger more established firms are catered to first, perhaps as a result of the magnitude of their demand and the trust in the larger firms ability to pay. The queuing system is pronounced in the cement and machinery equipment segments where shortages are more acute. This undermines the competitiveness of the firms as they will tend to have longer lead times, which push up the costs of the project. Lastly the coordination failures are more pronounced outside of Maputo where the rail infrastructure projects are taking place, where implements and inputs are less available and if they are at a very high cost.

Given these findings, the following recommendations are made.

Overarching Recommendation Sector Specific Industrial Policy

Given that civil construction sector is set to grow at the back of infrastructure investments and investments made mineral exploitation and that the sector creates the most value in the process of construction, there is a clear need for the Mozambican government to formulate a strategy that will develop this sector and its local capacities and capabilities. Given that South African domiciled firms are present in the space and have capabilities, there is scope for joint partnerships that could be mutually beneficial. Therefore a more integrated approach to jointly building capacity and capabilities is possible.

The analysis indicated that the strategy will have to tackle challenges that affect the civil construction sector as a whole and also the local Mozambican segment of the sector. Amongst the challenges are also opportunities that can be exploited.

Recommendation 1: Skills development civil construction sector – Mozambican government

Large multinational firms, specifically South African domiciled firms, have the resources to develop their work force as they offer on the job training with vocational training and training at technical colleges. The use of South African training facilities is not only reflective of the sector's comfort with exploiting existing training relationships, however it is also reflective of the lack of trust that the sector has in Mozambique's training facilities. Further investigations are required to assess whether or not Mozambique's training facilities adequately meet the requirements of the sector. This must come at the back of research that digs deeper into local Mozambican's capacities and capabilities in civil construction across a range of complex infrastructure projects. Notwithstanding, there is a need for a skills plan that matches the firms skills requirements with the Mozambique's training curriculum. This could be done through partnerships entered into by South Africa civil firms, local Mozambican and Mozambican and South African training institutions. These developments will benefit the sector as a whole if a mechanism is built into the skills plan to subsidise the local Mozambican firms skills needs.

Recommendation 2: Development Financing

Firms across the rail infrastructure value chain need to prove their financial depth in order to participate in large projects through bank guarantees. This is a huge barrier for local Mozambican firms, as the under developed capital markets and their limited track record in the industry makes accessing financing from banks a challenge. Therefore development financing is required through state backed guarantees. The possibilities of this financing is, highly dependent on the state's ability to extract the rents from resource exploitation.

Recommendation 3: Leveraging Public Procurement for Linkage Development in Civil construction sector

There clearly is a need to change the discretionary nature of the state's procurement provisions by ensuring that the procurement lever is used to develop the capabilities of local Mozambican civil work firms since this sector has the largest share of the pie.

This should be done by a) enforcing preference margins for local Mozambican civil works firms in activities for which there are existing capabilities to ensure that local Mozambican civil work firms with the requisite skills benefit and are further developed and b) enforcing preference margins for joint ventures between foreign and local Mozambican firms in activities for which there are nascent capabilities to ensure that local Mozambican firms can deepen their capabilities.

Recommendation 4: Mobilising South African Development Financing to develop Regional-Local Partnerships in construction sector

The continuation of regionalisation is based on the relative competitiveness of South African firms but it is also contingent on the nature of infrastructure financing as this sets the tone for the procurement strategy pursued. Therefore it is evident that regional development financing of infrastructure is required to ensure that both local and regional participants in the infrastructure construction value chain benefit from these activities.

The high price of key inputs also reflects the possibilities that exist in building strategic construction material manufacturing and retailing capabilities in Mozambique. The case of building a steel plant in Mozambique could be of benefit not only to the Mozambican industrial complex but also to the South African industrial complex as it could help to push down the price of steel in both countries.

Recommendation 5: Reducing Customs Barriers

The delays and corruption at customs poses a threat not only to the coordination game that firms must master for efficient delivery, but also affect the running costs of the project therefore inflates the price of the project. Therefore there is a need for system that reduces the delays. That will enable construction companies to receive materials on time and meet project deadlines which also reduce cost to the client when projects are completed on the scheduled time.

Recommendation 6: Legislative Issues

The South African government should help to market South African domiciled firms in Mozambique. Government to Government relations are required in understanding the governments' infrastructure plans and this information must be disseminate this information to South African domiciled construction value chain. Moreover the South African trade desk in Mozambique could provide a one stop shop that helps to deal with Mozambique's legislation and tender information. The South African government should find a mechanisms to engage the Mozambican government on double taxation, the repatriation of profits and VAT.

References:

ACIS, 2011. Legal framework for procurement of Goods, Services and Public Works by the Government in Mozambique. Sofala, ACIS II Edition March 2011.

African Union, 2009, Africa Mining Vision, available at <http://ti.au.int/en/sites/default/files/Africa%20Mining%20Vision%20english.pdf>

Andrade A. R., 2008, Renewal decisions from a Life-cycle Cost (LCC) Perspective in Railway Infrastructure: An integrative approach using separate LCC models for rail and ballast components, M.Sc. Thesis in: Civil Engineering

Baloyi B, Banda, S, Mapila K, and Roberts S, 2013, Background paper on African Industrialisation for Economic Development Department, CSID.

Business Monitor International, 2013. Mozambique Infrastructure Report Q1.

Buur, 2013, The Development of Natural Resource Linkages in Mozambique: The Ruling Elite Capture of New Economic Opportunities, Working Paper.

Buur, L., O., Therkildsen, M. Hansen, and M. Kjær, 2013, *Extractive Natural Resource Development: Governance, Linkages and Aid*. ReCom Study: Growth Enhancing Governance. DIIS Report, 2013.

Castel Branco, C.N. 2004. What is the Experience and Impact of South African Trade and Investment on Growth and Development of Host Economies? A View from Mozambique. (Paper presented at the Conference on “Stability, poverty reduction and South African trade and investment in Southern Africa”. Pretoria 29-30 March 2004).

Castel-Branco, C N and Goldin, N. 2003. Impacts of Mozal Smelter on the Mozambican economy. Paper Submitted to Mozal. 21 Sep. 2003, Maputo; online: http://www.iese.ac.mz/lib/cncb/Mozal_and_economic_development.pdf (accessed March 30, 2015)

Cruz. A.S., Guambe D., Marrengula. C.P., and Ubisse. A. F., 2014, Mozambique's Industrialisation, WIDER Working Paper 2014/059.

Dominguez-Torres. C., and Briceño-Garmendia. C., 2011, Mozambique's Infrastructure: A Continental Perspective, Africa Infrastructure Country Diagnostic Country Report

Emuze F.A., 2011, “Performance Improvement in South African Construction”, Phd thesis in Construction Management in the Faculty of Engineering, the Build Environment and Information Technology at the Nelson Mandela Metropolitan University.

Ford, N. 2012, ‘New Transport Investment Surges Continent wide. *African Business*, 359, 58.

Foster V. and C. Briceño-Garmendia, 2010, “Africa's Infrastructure: A time for transformation”, *The International Bank for Reconstruction and Development/World Bank*

Gann, D.M. and C. Salter., 2000, Innovation in project-based, service-enhanced firms: the construction of complex products and systems. *Research Policy*, 29(7-8): 955-72.

- Genesis Analytics, 2013, Demand and Opportunity Assessment and Analysis – Linkages in Mozambique, Commissioned by Building Markets with ACIS.
- Goldin, N. 2004. Linkage dynamics between large and small firms in employment generation and firm sustainability: the mega projects and large firms in Maputo, Mozambique. EGD and UNU-WIDER Conference- Unlocking Human Potential: Linking the Informal and Formal Sector. 17-18 September 2004, Helsinki, Finland.
- Government of Mozambique (GoM), 2012. HS 2007 Tariff Handbook.
- IFC, 2008. Mozambique - Moatize Coal Deposits, Infrastructure Advisory Services. Washington DC. USA.
- Khan. M., 2006. Governance and Development, paper presented at the 'Workshop on Governance and Development' organized by the World Bank and Dfid in Dhaka, 11-12 November 2006.
- Nhabinda. V., Marrebgula. C.P., and Ubisse. A., 2012. *The Challenges and the Way Forward for the Construction Industry in Mozambique*, International Growth Center Working Paper.
- Perkins. D., and G Robbins, 2011. The contribution to local enterprise development of infrastructure for commodity extraction projects: Tanzania's central corridor and Mozambique's Zambezi Valley, Making the Most Commodities Programme (MMCP) Discussion Paper No. 9 March 2011.
- Robbins, G., Lebani, L., Rogan, M. 2009. TNC FDI Firms and Domestic SME Linkages: Reflecting on Three SADC Case Studies. School of Development Studies Research Report No. 82. University of Kwazulu Natal.
- Sanec 2012. 'Port and Hinterland Development Mozambique: Fact Finding report'. online <http://portandcorridor.org/wp-content/uploads/2013/02/Sanec-Report-Mozambique.pdf>
- Stephens. J. L., 1994. The Political Economy of Transport in Mozambique – Implications for Regional Development, Ph.D. thesis in Institute of Development Studies, University of Sussex.
- Support Programme for Accelerated Infrastructure Development (SPAID), 2010, "Infrastructure Inputs Monitoring Project: Annual Review", The Presidency, Pretoria
- Rosenfeld, D 2012. 'The coal mining sector in Mozambique: a simple mode of predicting government revenue'. Conference paper no. 19. 4-5 September 2012
- TIPS, 2011. South African Rail Rolling stock manufacturing: Industrial Capacity and Localisation opportunities, commissioned by the DTI – Confidential
- United Nations Conference on Trade and Development (UNCTAD), 2005, Economic Development in Africa – Rethinking the role of Foreign Direct Investment, New York
- Walker M and Nicanor N, 2007. The Sectoral Impacts of the State Owned Enterprise (SOE) Capex Programmes on Industry in Ekurhuleni, A Report Submitted to the Ekurhuleni Metro, Corporate Strategy and Industrial Development Research

Programme (CSID), School of Economics and Business Sciences (SEBS), University of Witwatersrand, Working Papers

Wong. P. S. P., Cheung. S. O., Chan., L. L. Y., 2004, "Enhancing Construction Value Chain Effectiveness in Hong Kong", Construction Dispute Resolution Research Unit, Department of Building and Construction, City

World Bank, 2011, Railway reform toolkit: toolkit for Improving Rail Sector Performance, Washington DC

Appendix 1

<i>Organisation</i>	<i>Description, Use</i>	<i>Location</i>
<i>Support Programme for Enterprise and Economic Development (SPEED)</i>	<i>Sponsored by USAID, Linkage development</i>	<i>Rua Beijo da Mulata No. 98, 2o andar Sommerschild II, Maputo</i>
<i>Vale</i>	<i>Coal mining, Client Nacala</i>	<i>Maputo and Tete</i>
<i>CFM</i>	<i>SOE harbor and ports, Client Sena</i>	<i>Maputo and Beira</i>
<i>Emprememo</i>	<i>Contractors Association, linkage development</i>	
<i>CPI</i>	<i>Mozambique's Investment Promotion agency, linkage development</i>	<i>Maputo, Beira and Tete</i>
<i>Industrial Association of Mozambique (AIMO)</i>	<i>Mozambique's Industry Association, Linkage development</i>	

Appendix 2

Current Projects for Coal Basin	large scale Transport Infrastructure	Project discription	Promoter	Current Status	Project Costs
**Lichinga - Pemba (coal basin of maniamba)	Railway line and port	building railway line from scratch	??	Concept stage of market and field findings	Railway USD 3 billion Port 0.9 billion
*Moatize-Nacala Railway	Railway and port	new coal terminal and quay of Nacala-a-Velha. Railway line green and brown field from Tete/Moatize to Nacala port through Malawi	Vale	The Beginning of the prefeasibility began in 2006. Construction began in March 2012. The construction of railway line and port will is tabled to end in December 2014. The line has been split into 8 sections with different contractors doing each section.Capacity of rail and port link	Rail - USD 3.2 billion, Terminal USD 1.2 billion total cost is 4.4 billion

				is 22 million tonnes of which 18 million tonnes is coal	
	Nacala port	refurbishment and expansion of Nacala port	Jica	The work, which includes repairing the northern jetty, paving the container terminal, installing the equipment to modernise fuel operations and building a new rail terminal, began this month and was awarded to Japanese company Penta – Ocean Construction Co Ltd.	Port USD 232 million
**Chiuta-Nacala	Railway	Construction of new railway line	CFM, Private ENRC	Negotiation of concession ccontract	USD 3-4 billion. News paper 7 billion
	Port	Construction of Port	ENRC	Negotiation of concession ccontract	USD 1-1.5 billion
**South/North: Mutarara-Mutuli	Railway	Build new railway line	GoM/RPChina	CRBC (Chinese Firm) prepared feasibility study. GoM and RPChina are discussing the terms and funding from Chinese side	2.5 billion
**Linha Ferrea Moatize-Macuse	Rail and port	Build rail and port terminal. BOM	CFM (20%), Italthai (60%), Corredor do Desendvolvimento da Zambesia (Zambezi Integrated Development Corridor)	Tender awarded to promotor for construction begins in 2016. Losing bids are Zambezi Logistics Consortium - China Communications Construction Company, Australia Aurizon and Mozambique's Investe Logistica; SPI/Patel Engineering/Grindrod	3.5 billion
**Port of Beira	Port: new coal terminal	The investment will be made for developing the terminal with 10 million tonne (mt) a year capacity and also to provide a corporate guarantee of up to \$10 million on behalf of the joint venture, the Essar group firm said in its notice to the shareholders. Their nod has been sought through postal ballot.	CFM, Essar (70%) New Port Coal Terminal consortium .	Negotiations of concession contract between entre Essar/CFM e GoM. Essar Ports has sought the approval of its shareholders to invest up to \$25 million (about ₹150 crore) in a joint venture, which plans to develop a coal terminal at the Beira port in Mozambique. NCTB has already secured a letter of intent from the ministry of transport and communications of Mozambique granting a long-term concession for the development of this terminal on a DBOOT (design, build, own, operate and transfer) basis.	USD 25 million
Rehabilitation					
*Sena line	railway	improvement of crossing loop and refurbishment of Beira-Dondo section (sleeper, rail and fixings replacement; rail welding, leveling and mechanisation attack, signalling and referencing of rail track	Mota Engil and Visabeira Group	A key phase in this programme — construction of passing loops at 25 of the 31 stations on the line — has begun. The work is being carried out by a Portuguese consortium of Mota-Engil and Edvisa (part of the Visabeira group). CIL may take a stake in this line to facilitate transportation of coal, which its mines produce. CIL executives, however, clarified that the proposal is at a "very preliminary stage".	USD2.375

Appendix 3: Interview list South Africa

Rail Consulting engineers	Location
SMEC	Ferndale
Worley Parsons	Rosebank
ARUP	Melrose
Civil engineering	
Aveng Grinalker	Boksburg
Murray and Roberts	Bedfordview
Group five	Sunninghill
WBHO	Wynberg
Basil Read	Boksburg
Rail Construction	
Aveng Lennings Rail SERVICES	Boksburg East Johannesburg
Grindrod	Sandton
Rail Construction	
Rail Raw Material Provides	
Construction Machines	
Plasser South Africa	Rooderpoort
Yale Engineering Products (Import)	Honeydew Johannesburg
Bell Equipment	Boksburg
Barloworld	Isando
Sleepers Manufacturers	
Aveng infraset	Germiston
Cement	
Lafarge	Industria West
Afrisam	
Signaling Equipment	
ERB Technologies	Midrand
Rail	
Aveng Trident Steel	Mpumalanga
Scaw Metals	Newcastle

Appendix 4: Interview list Mozambique.

Institutions	Location
Ministry of Planning	Maputo
IPEME	Maputo
CTA	Maputo
Ministry of Public Works	Maputo
US SPEED	Maputo
World Bank	Maputo
Civil Engineering firms	
Texteira Duarte	Maputo
Canol	Maputo
Terratech	Tete
CETA	Tete
Arouca	Tete
ALM	Tete
Equipment Suppliers	
Equestra	Tete
Clients	
Vale	Tete