

The contribution to local enterprise development of infrastructure for commodity extraction projects: Tanzania's central corridor and Mozambique's Zambezi Valley

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MAKING THE MOST OF COMMODITIES PROGRAMME

Like many other developing economy regions, Africa is benefitting from a sustained boom in commodities prices. Received wisdom has been that commodities production is an inherently enclave activity and that it undermines the viability of industry. The Making the Most of Commodities Programme challenges this negative view of the commodities sector. It's research analyses the determinants of backward and forward linkages, identifying policy responses which will broaden and deepen them. In so doing it contributes both to achieving sustainable growth and the spreading of benefits to a wider population. By incorporating younger researchers, building a research network, and dialogue with policymakers, the MMCP also seeks to build analytical and policy capacity, and to influence policy outcomes.

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Abstract

*This report investigates in what way the provision and management of infrastructure (or shortcomings therein) has constrained or enabled mining investment **and** local firm linkages to this mining activity (with a primary focus on the recent experience on Tanzania's Central Development Corridor and the Zambezi Valley in Mozambique). The usefulness of the development corridor approach to enhance the scope for linked small enterprise development and more diversified economic development is explored in the context of increased minerals investment.*

The points of focus in the research demonstrate an awareness of the need to break away from the so-called "enclave" model of resource extraction that characterized Africa's colonial past where infrastructure developed primarily to serve narrow interests and objectives of those seeking to exploit the continent's resources. For governments and other stakeholders managing the complexities associated with configuring and timing large-scale infrastructure investments to enable much needed foreign direct investment, the development corridor approach has been suggested as one which might offer scope for balancing the needs of large scale, largely foreign, investors with those of wider domestic economic and social interests. The study findings point to a variety of factors that have made the necessary coordination by different stakeholders hard to achieve: at best a process with limited and incremental gains in Tanzania but one with a higher degree of measured progress in Mozambique. By adopting progressive policies and creative solutions to the delivery of infrastructure upgrades in the Zambezi Valley, it appears that the prospects for leveraging mineral investments to enable diversified economic development have been enhanced. On the Central Development Corridor, the continuing dysfunctionality of much of the corridor infrastructure continues to constrain "anchor" mineral investments, wider domestic business growth and the appetite for greater local procurement by the mining companies. Issues associated with mining of different commodity types, political will and forms of regional collaboration and their impact on the potential utility of the development corridor approach are also discussed.

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Executive Summary

Introduction

The East African region plays host to some continentally, if not globally, significant mineral deposits including those of gold, iron ore, coal and nickel. These have for much of the second half of the twentieth century remained largely unexploited as a result of depressed global prices, inaccessibility, policy instability and the resultant disinterest from investors and their financiers. However, the past decade, whilst perhaps not witnessing a stampede of investors to the region, has certainly seen a sustained level of interest in advanced exploration and the opening (in some cases re-opening) of fully functioning mines in a number of areas. Tanzania has, since the late 1990s, been an area of considerable focus for gold mining companies as the country has become the third largest gold producer in Africa (World Gold Council, 2009). More recently the Tete Province of Mozambique has witnessed a rush of investor interest in its substantial coal reserves. This activity has present these less developed countries in the past decade or so with the first glimmer of opportunity with regard to being able to grow their economies and thereby move to reduce pervasive poverty.

This report seeks to investigate in what way infrastructure provision and management (or shortcomings of such provision and management) might have constrained or enabled mining investment **and** local firm linkages to this mining activity (with a primary focus on the recent experience of Tanzania's Central Development Corridor as well as that of the Zambezi Valley in Mozambique). The usefulness of the development corridor approach to enhance the scope for linked small enterprise development to improve their prospects is explored in the context of increased minerals investment. The points of focus in the research demonstrate an awareness of the so-called "enclave" model in Africa's colonial past where infrastructure developed primarily to serve narrow extractive objectives of those seeking to exploit the continents resources.

In reporting on the findings in this research report there are a number of statements that appear to be well supported either by the literature or by the research field work or by both. These might appear somewhat trite statements but drawn together they do present a potentially coherent framework around which policy can enhance development prospects for individual actors and for improved distributional gains. The statements are listed below:

- The type of mineral commodity being mined has impacts both in terms of thresholds for corridor processes and in terms of related linkage opportunities
- Geography is important – to enable scale to fund infrastructure and to inform design of nodes of connectivity along corridors. This in turn requires an embracing of more effective spatial planning.
- Policy integration and political will is necessary – domestically and regionally to maximize windows of opportunity around the mining sector and its potential impacts
- Investment in infrastructure is necessary, but so is the quality of the management of the infrastructure and the related policy environment

- Corridor planning and institutional arrangements offer the scope to enhance multiple points of connectivity for different layers of actors
- A bad business environment for SMEs will damage prospects for linkages

The Central Development Corridor in Tanzania

Connecting the Tanzanian maritime Port of Dar es Salaam with its Great Lakes hinterland, the Central Corridor is defined by three main constituent elements: its port, railway and road systems. The reach of the Central Development Corridor (CDC) extends into Rwanda, Burundi, the DRC and Uganda. Situated at the north-west extreme of the Tanzanian part of the CDC is the regional cluster of gold mines that has in the past decade been the major contributor to Tanzania's growth in FDI and in its economic resurgence.

The Central Development Corridor Spatial Development Initiative (SDI) is currently being implemented under the auspices of the Tanzanian and Rwandan governments. The institutional arrangements for CDC SDI are detailed in an agreement signed on the 14th January 2005 between the Minister of Infrastructure Development in the United Republic of Tanzania and the Minister of Commerce, Industry, Investment Promotion, Tourism and Co-operatives in the Republic of Rwanda. Although, Burundi and the DRC are not signatories to the agreement¹, representatives of these two governments have participated in CDC SDI processes and in certain key economic sectors, the work of the SDI has included coverage of the Burundian and eastern DRC economies.

The stated intent of the agreement is to achieve the following objectives:

- Achieve sustainable socio-economic development and integration by unlocking the underdeveloped potential in the corridor area;
- Develop adequate, reliable, cost effective, efficient and seamless transport, telecommunication, and energy systems so that the corridor is competitive;
- Foster and catalyze the involvement of public-private sector partnerships for the development of agro industrial, manufacturing, tourism, mining and service sectors;
- Re-orient the corridor trade and investment through the promotion of human settlement, minimize rural-urban migration, alleviate poverty and strategically position economic activities concerned into the mainstream of global trade;
- Promote smooth interstate trade and investments in order to create job opportunities and enhance the people's standard of living; and,
- Facilitate the mobilization of local and international resources to augment government capacities to speed up corridor development.

In line with the SDI approach of seeking to make feasible major infrastructure projects through connecting them with large scale economic opportunities considerable work has been done to demonstrate the scope for the unlocking of mineral extraction potential in western Tanzania and the Great Lakes region. The

¹ The CDC SDI agreement provides for the accession by other corridor countries. With increasing political stability in Burundi and the eastern-DRC conditions are increasingly favourable for the incorporation of these countries as part of the CDC SDI

case for the CDC has been further reinforced by studies demonstrating the substantial agricultural potential along the CDC which would be enhanced through improved functionality of infrastructure.

Findings on the CDC

Despite considerable efforts to facilitate the necessary coordinated decision making between public and private actors little real progress has been yielded and the infrastructure servicing the corridor and its varied stakeholders continued to constrain development opportunities. The range of stakeholders interviewed point to a number of common factors which they believe reduce the scope for productive sector gains in the Tanzania economy from the existing mining activity. These included the generally uncompetitive business environment for domestic enterprises which is seen as substantially influenced by the poor quality of infrastructure and services; the tendency by both mining companies and government to place lower emphasis on linkages with domestic enterprises in their interactions; and the lack of a bold programme to modernise Tanzania's infrastructure along major corridors and in towns and cities.

Infrastructure issues were seen by stakeholders as undermining the potential of local firm capabilities where larger trans-national suppliers tended to have the wherewithal to manage the impacts of these challenges. On the issue of the corridor concept there was not a strong set of responses from the mining company stakeholders with the exception of the company interested in exploiting bulk-export commodities requiring substantial rail and road infrastructure not just in Tanzania but also at a regional level. All respondents were aware of the corridor discourse in Tanzania and agreed, citing the Maputo experience, to the importance of the approach. However, none felt that there was much in the way of evidence of a coordinated infrastructure delivery strategy being implemented and noted that tendency for many of the plans to remain paper-bound. Dialogue had taken place, often through consultant interactions or via the Chamber of Mines, but there was little to suggest that the few activities that had taken place such as upgrades in the port and some road network improvements were being matched by coordinated efforts to integrate planning, management and delivery.

Both the field work and the survey of literature and varied documentation reinforces the claim that shortcomings in Tanzania's infrastructure constrain growth and firm productivity. This holds true for small business and for major mining companies and their partners. The quality and accessibility of infrastructure contributed to particular allocative choices by mining firms which it appears does militate against contracting firms that might be particularly exposed to risks associated with infrastructure challenges. Mining companies place considerable priority in using rent accrued from their activities to reduce exposure or to overcome these challenges. It goes without saying that the bulk of domestic enterprises have neither the resources nor the expertise to reduce such risks and so bear the burden of absorbing these and their associated costs. The dispersal and remoteness of much of the mining activity aggravates these barriers and many local enterprises do not have the scale contracts to help offset some of the costs that come with the resultant challenges.

At the point of writing this report the findings generated from the research process led the authors to the following statements on Tanzania's CDC experience:

- The character of the mining activity in the north-west gold mining area of Tanzania was generating only limited linkages with domestic enterprises. Although this was growing from a very low base it was reported by most respondents as being further undermined by shortcomings in infrastructure both affecting the mining strategies of the mining companies and the domestic enterprise sector.
- The CDC process and a greater commitment to infrastructure spending by the Tanzanian government and its donors had witnessed widespread efforts to enhance the integrated infrastructure offerings within the corridor and their related performance. However, the enormous backlogs and the scale of investments and capacity enhancements required have tended to see these efforts only having a marginal impact.
- The lack of economic thresholds in infrastructure use that would be generated by large-scale bulk mining operations – such as those with the Richard Bay Coal line and the Sishen Iron Ore line in South Africa – make the realization of significant enhancements to the entire CDC a major challenge. Although such mineral resources do exist in the East African region served nominally by the CDC they require a combination of diplomatic alignment and innovative multi-lateral development financing agreements to help secure the capital investment in infrastructure that would make the mining of the commodities anything other than wishful thinking.

It is for this reason that the original terms of the study concluded with something of a cul-de-sac in that the expected connections that envisaged in the conceptualization of the Central Development Corridor appeared not to have yielded the level of progress required to make infrastructure investment viable in a manner that would in turn enable further domestic linkages as a result of mining investment. Under these circumstances the prospects of further widening the benefits of the CDC in the near future are likely to be considerably constrained.

These conclusions were interrogated in some depth within the Making the Most of the Commodities Programme research process. In an effort to test the core research questions in a different context a decision was taken to examine them in the light of a scan of other potentially comparable experiences in the region. The authors' exposure to the rapidly growing investments commitments in the Tete coal mining area of northern Mozambique presented some interesting potential comparative potential. Here was a different commodity being mined with different mining and logistics dynamics to gold in an area with severely degraded infrastructure and remote from major economic nodes. The section which follows provides an overview of this experience and suggests that in comparison with the CDC that some of the potential linkage connectivity can be possible should the appropriate conditions be in place.

Mozambique's Zambezi Valley

Although the linkage dynamic in Mozambique's Moatize coal mining area remains somewhat limited to date and the mining is in its development stage it is notable that in the context of a different commodities, with different mining companies and a more proactive state that the types of connections envisaged in the CDC – between mining investment and infrastructure development – can be realised. Whilst processes underway have not yet yielded the decisive investments in rail and other infrastructure, agreements have been secured such that mining sites are in advanced stage of development and approaching pre-production. This demonstrates a high degree of confidence amongst the core role players that the necessary interventions will follow in the near future.

In addition to these short-term measures, the Government of Mozambique wishes to develop longer-term minerals transport and logistics solutions that are part of a wider, more integrated economic development strategy for the Beira, Nacala and Zambezi Valley Development Corridors. In this regard it has arrived at two key policy conclusions, namely: that Mozambique needs to use its comparative advantage in natural resources as a catalyst for diversified economic growth and development; and that any strategy to promote infrastructure development must be informed by its economic context. This reflects a clear recognition of the inter-relationship between natural resource investment and infrastructure development and has been captured in the recently adopted "Strategy for the Integrated Development of the Transport Sector".

This new strategy also recognises the role of the transport sector as a key determinant of social and territorial cohesion, economic competitiveness and the imperative for regional integration. It aims to develop an integrated transport system that facilitates investment and the further growth of the national and regional economies, simultaneously reinforcing SADC attempts to promote regional economic integration while also responding to the needs for energy efficiency and security. This marks something of a departure from tradition in that the strategy was defined taking into account both the declared strategies of other sectors such as mining, agriculture, tourism and public works, and also the high levels of investor interest in the exploitation and development of Mozambique's natural resource sectors. Furthermore it explicitly advocates the adoption of development corridor planning methodologies² focusing on integrated planning and management of transport, energy and ICT infrastructure development with linked anchor investments (particularly those in the natural resource sectors) by the private sector.

Contrasting the experiences

The following table provides some comparative reflection of the contexts from the two studies. This is useful to keep in mind when exploring the emerging results from the two contexts. What is particularly notable is that there are a variety of different contextual factors that predominate in the two research areas.

² In particular the Spatial Development Initiatives methodology successfully applied previously in Mozambique on the Maputo Development Corridor in partnership with the Government of South Africa.

Comparison of contexts: Tanzania and Mozambique study areas

Context	Tanzania (CDC)	Mozambique (Zambezi/Tete SDI)
FDI (2005;2008) USD millions*	498; 744	108; 587
Mining commodity	Gold	Coal
Mass measure of output	ounces	tonnes
Logistics character of existing mining	Input import dominated	Output bulk export dominated
Infrastructure mix requirements of mining type	Road dominant because of lower export volumes with existing gold mining.	Rail dominant because of volumes from coal mining.
Existing available infrastructure connecting mining area to coastline	Weak with some road functionality (rail largely dysfunctional at present).	Weak with some limited rail and road functionality.
Source of multi-national investment in mining	Europe and North America	South Asia and Latin America
Character of public policy	Very cautious around mining and seen as competing with needs of public sector from agriculture.	Oriented to incentivise large-scale FDI projects to help drive modernisation of the economy.
Policy around investment in infrastructure (general)	Growing slowly from a low base. Have experimented with PPP on rail but failed.	A decade of exposure PPP through Port of Maputo and Maputo Development Corridor.
Policy around infrastructure to support mining	Tendency to require mining companies to make their own plans.	Government agreement with CVRD/Vale committed the government through CFM ³ to upgrade Sena Rail line via concession. ⁴
Linkages policy framework	Emerging belatedly in local policy.	Experience from the Mozal aluminium programme intended to be carried into policy on mining.
Approach of multi-nationals	A belated focus on linkages and low commitment from finance partners to cost sharing in infrastructure.	A stronger internal focus on linkages and direct experience in co-funding and management of infrastructure (eg Vale in Brazil and Australia).
Corridor authority	Programme exists under the National Development Corporation, Corridor Authorities under Transport Ministry.	Not yet established but SDI Programme based in Ministry of Transport mimics the corridor programme (to be possibly formalise in future as an authority based on Maputo Corridor Logistics Initiative experience)

What does all this mean in terms of the over research findings?

In contrast to the Tanzanian experience, the pointers in Mozambique are that there is a closer alignment of transport infrastructure development commitments by government and the needs of the mining companies. In fact in some recent cases, the very investment made by the mining companies has been made possible largely by a series of commitments, by government and the private sector, to a negotiated process to build the collaborative framework for infrastructure investment that would

³ CFM is Portos e Caminhos de Ferro de Moçambique – the parastatal overseeing Mozambican Ports and Railways.

⁴ Although the Sena Rail concession has experienced many problems there has been a high degree of priority given to it by the Minister of Transport to resolve matters and progress the necessary investments.

in turn make the mining of a bulk commodity such as coal feasible. In this process it is also notable that issues of linkages not just to other potential bulk users of transport infrastructure such as rail have been given attention, but also linkages in the sense of seeking to make connections with local enterprises both directly to the mining companies as well as to the opportunities that might arise from improved infrastructure (though the merging Mozambique SDI Programme which is devoting a lot of attention to the Zambezi Valley given the private sector demand for support). Although to date these linkage processes are only very embryonic it is important to recognise that they are part of a dialogue whilst the mines and infrastructure are being developed and not only being tapped into in the later operational phase of mines. The factors proposed in this study as driving these apparent differences with the Tanzania case are discussed below.

Policy and Political Will Matters

Governments across the region display significant differences in the level and nature of their commitment to sound minerals governance and the extent to which they support private sector investment in the mineral sector. Similarly they also exhibit differences in the extent to which their policy environments encourage private sector participation in large-scale infrastructure investments in response to new mining developments. But perhaps more critically, even when the policy framework is conducive, different governments display different levels of political will and commitment to proactive engagement and partnership with mining companies.

Ownership matters

Comparative experience in Tanzania and Mozambique suggests that different companies behave differently when it comes to working with governments around shared costs for infrastructure solutions. This may be a function of either the different financial capabilities of large multinational mining companies and junior mining companies, or, it may also reflect in some instances a closer affinity between mining companies headquartered in the South operating in other countries of the South.

Type of Commodity Matters

The type of mineral commodity matters hugely in so far as different mineral commodities yield:

- differences in the level of demand (and hence economies of scale and viability) they create for the transport and energy infrastructure that their extraction and evacuation to a point of export (and importation of inputs) demands; and
- differences in the extent to which the extraction and possible processing of different commodities can foster backward and forward linkages (and cross-sectoral linkages).

Regional Factors Matter

The extent to which a corridor traverses more than one country and is truly regional in nature also matters. Generally speaking, the more countries a corridor traverses, the greater the requirement for inter-state cooperation and coordination to ensure the

efficiency of infrastructure systems. Managing transport or energy infrastructure concessions and PPP investments is considerably simpler on corridors traversing only one country.

Conclusions and recommendations

The question asked in this study can be phrased as follows: “Does the new round of commodity investment in Africa, often needing further stretching of truncated colonial-era corridors, justify the investment taking into account the broader development needs around strengthening the role of domestic enterprises?” The answer, arising from this study is, “No, not without some sustained and coordinated action.” The somewhat muted evidence from Tanzania and the slightly stronger signals from Mozambique suggest that conscious action is needed to match the potential of a cluster of commodity extraction projects with an imperative to redesign extractive infrastructure patterns to take in a network of hinterland urban centres that help build thresholds necessary for nascent domestic enterprises and also contribute to notions of economic integration.

The policy issues that have arisen through the course of this study have been implied or stated explicitly a number of times in this document. Some of the key elements that have been noted include the following:

- Hard infrastructure requirements (transport & energy) vary per mineral commodity but there are synergies from scale effects in terms of investments that can support new investment across the region. Using the corridor framework to plan and manage delivery and functionality offers substantial potential benefits as opposed to more fragmented approaches and methodologies.
- Soft infrastructure is also very important and at times more important than Hard Infrastructure (e.g. custom processes).
- Policy, Legislation and Political will (& strategic intent) are important to send the correct signals from policy makers to investors and enterprise owners. A higher risk policy environment is unlikely to enable the kind of partnership arrangements that both corridors and linkage processes require.
- The widening gap between mineral and infrastructure investment cannot be sustained. To encourage investments that offer a potential to encourage longer term economic structural change there must be greater synergy between plans of mining companies and governments.
- The above points combined with the experiences documented in this study also point to a growing need for deliberate, purpose designed measures to enable combinations of mining investment, infrastructure development and linkages with the domestic productive sector to be engineered as part of an integrated programme.

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Acronyms

AICD	Africa Infrastructure Country Diagnostic
ACDP	African Corridor Development Programme
CCFB	Companhia Dos Caminhos De Ferro Da Beira
CDC	Central Development Corridor
CDN	Corredor de Desenvolvimento do Norte
CCTTFA	Central Corridor Transit and Transport Facilitation Agency
CFM	Portos e Caminhos de Ferro de Moçambique
COMESA	Common Market for Eastern and Southern Africa
CSI	Corporate Social Investment
CVRD	Companhia Vale do Rio Doce (or Vale)
DBSA	Development Bank of Southern Africa
DFID	Department for International Development
DRC	Democratic Republic of Congo
EAC	East African Community
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
HIPIC	Highly Indebted Poor Country Initiative
ICT	Information and Communication Technology
IDA	International Development Association
IFC	International Finance Corporation
JCI	Johannesburg Consolidated Investments (subsequently JCI Gold)
LLC	Land Locked Countries
MCLI	Maputo Corridor Logistics Initiative
MMCP	Making the Most of Commodities Project
MNCs	Multi-national Corporations
Mtpa	Million tonnes per annum
NCTA	Northern Corridor Transit Agreement
NCTTCA	Northern Corridor Transit Transport Coordinating Authority
NDC	National Development Corporation (Tanzania)
NEPAD	New Economic Partnership for African Development
NGO	Non-Government Organisation
NSI	National System of Innovation
ODA	Official Development Assistance
PPP	Public-Private Partnership
SADC	Southern African Development Community
SDI	Spatial Development Initiative
SMEs	Small and Medium Enterprises
SSA	Sub-Saharan Africa
TAZAMA	Tanzania Zambia Malawi fuel pipeline
TAZARA	Tanzania Zambia Railways Authority
TEUs	Twenty-foot Equivalent Units (for containers)
TFCA	Trans Frontier Conservation Areas
TNCs	Trans National Corporations
TRC	Tanzania Railways Corporation
TRL	Tanzania Railways Limited
TTCA	Transit and Transport Corridor Authority
UNCTAD	United Nations Conference on Trade and Development
USA	United States of America
USD	United States Dollar
WBG	World Bank Group

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1 Introduction

“When Taaffe, Morrild and Gould (1963) wrote their seminal paper on transport expansion in underdeveloped countries, they described the typical colonial transport system as consisting of penetration lines or transport corridors (mostly based on railways) linking export ports with their hinterlands, but they expected that with independence the developing countries would develop more integrated transport networks. However, in Sub-Saharan Africa these expectations have generally not been fulfilled. During the 1960s, around independence, many of the African countries experienced a short burst of infrastructure investments, but it soon stopped and for almost two decades (from the end of the 1960s to the mid-1980s) the transport systems stagnated or even deteriorated, and colonial transport policies to a large extent continued unchanged.” (Pedersen, 2001: 1)

The reasons for this decline in infrastructure investment are complex and varied but many countries do share some common features including declining receipts of state revenue arising from the commodity price declines of the 1970s; political and economic instability; curtailing of state-led capital programmes under Structural Adjustment Programmes; rising debt burdens; and weak economic performance. In many cases a lack of investment and maintenance was aggravated by problems in the management of the infrastructure systems – for example causing major delays in processing of product through ports.

The consequence of this sustained period of neglect and mismanagement of infrastructure has been that sub-Saharan African countries have struggled to grow their economies and to attract new investment in productive activity. Not only has the sourcing of inputs and the distribution of goods been made difficult and expensive within countries, but this has also been made all the more problematic in a context where global levels of trade have been supported by major investments and upgrades in performance of infrastructure and related services⁵. As is implied above this has been a barrier to the growth and development of a Foreign Direct Investment (FDI) sector in the economies of Sub-Saharan Africa (SSA) and therefore also a major constraint on the growth and development of local enterprises (as is so evident from Business Climate and Investment surveys conducted by the World Bank and others).

This report seeks to investigate in what way infrastructure provision and management (or shortcomings of such provision and management) might have constrained or enabled mining investment **and** local firm linkages to this mining activity (with a primary focus on the recent experience of Tanzania and more particularly the Central Corridor). The objectives of this particular study were substantially influenced by the requirements of the Hewlett Foundation⁶, (the project funder), which is active in the support of programmes for enterprise development in the developing world. As part of this commitment the organization is eager to

⁵ “In addition to the strong effect of the cost of maritime transport on trade, the efficiency of getting goods to market is very important. A decrease in the time spent at sea of one day on the average sea voyage of 20 days implies an increase in trade of 4.5%.” (Korinek & Sourdin, 2009: 5)

⁶ <http://www.hewlett.org/>

examine, through this study, the degree to which the corridor concept, in the context of increased minerals investment, has the potential to enhance the scope for linked small enterprise development (in particular rural producers) to improve their prospects. Drawing from the concept note informing this study, the Hewlett Foundation explains that,

“The Central corridor between Tanzania and Rwanda links mining businesses (gold and nickel) in the interior with the port of Dar-es-Salaam and runs through fertile agricultural areas in Tanzania. This corridor, which by extension includes Burundi, Uganda and the Democratic Republic of the Congo, has great potential for agriculture, fisheries and tourism. But the corridor needs substantial core infrastructure, including improved road networks, a rail upgrade and extension, port upgrades, increased electricity generation, and an expansion of the electricity grid. Through private investment and taxes, returns from the mineral wealth would be used to finance such core infrastructure upgrades, which would provide the springboard for publicly-financed secondary and tertiary infrastructure investment. Other efforts, such as encouraging the gold and nickel mines to source their supplies locally, can foster more sustainable and broad-based growth through agriculture, agro-processing, and related SME development.” (Hewlett Foundation, ACDP concept note)⁷

However, it is also important to note that the study has been organized under the auspices of the Making the Most of Commodities Project (MMCP)⁸. The MMCP has identified the following as the prevailing problematic that has been informing policy with regard to strategies that focus on commodity-oriented economic development:

“The prevailing view is that an extensive focus on the exploitation of comparative advantage in the commodities sectors undermines the development of manufacturing and associated services. The MMCP view is that the exploitation of comparative advantage in the commodities sectors can therefore be made to be synergistic with the development of manufacturing and associated services. Accordingly the underlying theme of the MMCP research will be concerned with how the commodities sector offers the possibilities for the local development of commodity associated manufacturing and service activities both the breadth and depth of linkages between the commodities sectors and upstream and downstream industry and services, as well as the knowledge intensive activities servicing them.” (MMCP March 2009 Workshop Report)

As part of the MMCP’s research framework a decision was made to focus on six fields of research across a number of case studies: ownership, infrastructure,

⁷ It is noteworthy that the ACDP concept note not only suggests that the corridor development, through the enhancement of infrastructure can support local enterprises, but further that enhanced economic development along a corridor might make it possible to secure the necessary finance for corridors to be developed. The study proposed in this document will focus on the former.

⁸ The MMCP is a collaborative research and policy project between the University of Cape Town (UCT) and the Open University, United Kingdom (OU). It is institutionally located within the research unit Policy Research in International Services and Manufacturing (PRISM), School of Economics, UCT. The MMCP is funded by three donor funds – IDRC, Hewlett Foundation (for the specific work on corridors and linkages), and an Anglo American Award. The project began in January 2009.

national system of innovation, skills spillovers, regional linkages, policy impacts. Six specific hypotheses were identified to inform the various countries and cross cutting research studies:

1. Relations of ownership in the commodities sector affect the extent to which economies are able to make the most from commodities.
2. The extent and quality of infrastructure affects the extent to which economies are able to make the most from commodities.
3. The nature of linkages between the commodities sector and the NSI in the local economy affect the extent to which economies are able to make the most from commodities.
4. Skills spillovers from the commodity sector affect the extent to which economies are able to make the most from commodities.
5. Regional hubs for the supply of inputs and knowledge intensive services and technologies into the commodities sector – notably from South Africa, but also from elsewhere such as West Africa affect the extent to which economies are able to make the most from commodities.
6. Policy affects the extent to which economies are able to make the most from commodities.⁹

This Hewlett-supported project, whilst having its own area of focus, intersects with a number of these generic hypotheses thus allowing interaction between research teams working on aspects of these in selected MMCP country studies and the Hewlett project. Furthermore, one of the MMCP country studies will look specifically at upstream linkages in Tanzania's gold mining sector enabling more direct interactions in the research work. It should be noted that the Hewlett project has a strong policy orientation and this will influence the method of this project which will however, also seek to draw some methodological reference points from the overall MMCP framework.

The research process also required that the research team review preliminary findings within the MMCP project process. This process of peer review led to an important additional leg to this project, namely the drawing in of some material from Mozambique's Moatize coal fields to enable some comparison with the Tanzania Central Development Corridor experience. This was driven by a variety of issues. In the first instance during the research process the Central Development Corridor process faced major structural damage to the already weak transport infrastructure during some major floods. Alongside this the major bulk nickel mining project that was proposed along with gold mining as a core anchor to make viable investment in the corridors infrastructure was placed on the proverbial back-burner – influenced both by the rail dysfunctionality and by global economic conditions. The expected evolution of the CDC over the study period did not take place and as such the likelihood of showing some of the effects proposed in the research design was substantially reduced – as borne out in the findings. The coincidence of the researchers' involvement in Mozambique enabled a rapid engagement with this environment in order to test how the findings might be impacted under different conditions.

⁹ A seventh issue was also explored as a result of initial project workshops which related to exploring the differentiated impact different commodity types would have on the opportunity for linkages and the infrastructure requirements.

1.1 The “story”: key themes emerging from the research

The East African region plays host to some continentally, if not globally, significant mineral deposits including those of gold, iron ore, coal and nickel. These have for much of the second half of the twentieth century remained largely unexploited as a result of depressed global prices, inaccessibility, policy instability and the resultant disinterest from investors and their financiers. However, the past decade, whilst perhaps not witnessing a stampede of investors to the region, has certainly seen a sustained level of interest in advanced exploration and the opening (in some cases re-opening) of fully functioning mines in a number of areas. Tanzania has, since the late 1990s, been an area of considerable focus for gold mining companies as the country has become the third largest gold producer in Africa (World Gold Council, 2009). Discussions with investors in these mining activities reveal that, to a large degree, these mines have been operationalised in spite of major infrastructure shortcomings and certainly not because of them – although the move by the Government of Tanzania and donors to enhance spending on roads and port systems as well as to improve their management has been mentioned as a significant risk reducing factor for investors. Ultimately, investors point to the high London Metals Exchange (LME) gold price as having enabled mining companies and their suppliers to overcome barriers caused by the higher capital investment requirements of setting up a mine and the high operational costs of managing a mine in a context of poorly managed and poor quality infrastructure¹⁰.

Mines generally operate with thousands of workers and extensive capital equipment, and this imposes a daily cost burden regardless of production levels. In some cases the daily operating cost of a mine (including equipment leases, specialist contractors, energy, labour) can run into millions of dollars. The more remote a mine location the more likely the mine is to establish itself as self-sufficient as possible carrying substantial inventory and investing heavily in both its supply and product distribution logistics arrangements because of their critical path significance. Where mining companies decide to outsource they tend, in their highly specialised development processes and in their operations, to depend heavily on supply partners that have specialized knowledge and demonstrated capacity in their fields. It has been rarely a priority for the paired down management structure of mines or their increasingly ethereal corporate structures to choose to specifically build local or domestic supply capability unless an operational logic demands it. However, the process of mining has always been one that has required the negotiation of trade-offs. As finance houses, major trans-national corporations and more recently corporate agents of sovereign states, have sought out new resources to tap and as a brighter light has been directed towards the examination of longer term social and environmental consequences of many mining operations, corporate strategies have begun to sophisticate and national governments have sought to encourage greater domestic connectivity in mining activity whether it be in terms of revenue agreements or supplier commitments.

¹⁰ Respondents pointed out that the gold price had been close to the USD 1000/oz level for some time (rising from around USD 500 in 2006 to above USD 1200 in late 2010) and that mines in the Country could extract gold at a cost of somewhere between USD 350/oz and USD 450/oz prior to absorbing refining costs.

Thus, in contemporary Tanzania one is hard pressed to find a mining company or a government department that is not interested to one degree or another in encourage greater commerce between Tanzanian nationals and their enterprises and the mining houses that have in a short space of time come to dominate the economy. However, despite, this growing focus and the demonstrated potential for growth in the value, volume and complexity linkage relationships (World Gold Council, 2009; Society for International Development, 2009) this study and that of supporting MMCP research (Mjimba, 2010; Hanlin, 2010) suggests that results remain somewhat muted or limited to the somewhat hazy terrain of corporate social investment (CSI) arrangements. It is in exploring the barriers to this linkage formation and in particular how these barriers might intersect with infrastructure provision along, within and around the planned Central Corridor that this study takes root.

In reporting on the findings there are a number of statements that appear to be well supported either by the literature or by the research field work or by both. These might appear somewhat common sense but drawn together they do present a potentially coherent framework around which policy can enhance development prospects for individual actors and for improved distributional gains. The statements are listed below and explored briefly in the text that follows:

- The type of mineral commodity being mined has impacts both in terms of thresholds for corridor processes and in terms of related linkage opportunities
- Geography is important – to enable scale to fund infrastructure and to inform design of nodes of connectivity along corridors
- Policy integration and political will is necessary – domestically and regionally to maximize windows of opportunity around the mining sector and its potential impacts
- Investment in infrastructure is necessary, but so is the quality of the management of the infrastructure and the related policy environment
- Corridor planning and institutional arrangements offer the scope to enhance multiple points of connectivity for different layers of actors
- A bad business environment for SMEs will damage prospects for linkages

The type of commodity impacts on the type of opportunities

The type of commodity is key (as emerging evidence from the Mozambique case shows). While this point appears trite it remains worthy of significant attention. This project paid particular attention to the dominant mining activity in Tanzania, namely that of gold mining. The nature of the mining and processing activities around gold within Tanzania have different ramifications on both the likely pattern of linkages and the scope for building thresholds around corridors. This point is further substantiated by preliminary material presented from work being done by the authors in the Tete area of Mozambique around a very large set of coal mining activities.

The geography of people and minerals deposits is important.

Whilst the majority of the people of Tanzania and Mozambique still live in predominantly rural areas it is to the towns and cities that people are moving as economic activity matures and urban centres provide a growing share of GDP. Dispersed mining investment activity, often in relatively remote areas is showing

trends of both reinforcing and disrupting some urbanisation patterns in centres servicing the mining regions and the major logistics nodes (as in the case of Dar es Salaam with its port). Infrastructure within, and connectivity between, these centres is often highly compromised, erratic in service quality and expensive¹¹. Both rural farming enterprises and urban enterprises need the infrastructure connections between different centres to work and for the infrastructure within market centres to function to enable their business prospects to be realised.

Regional integration is important.

1. Map after map shows a slew of mineral resources around the Great Lakes region encompassing western Tanzania and there is growing evidence of such resources also being present in Mozambique. These remain largely undeveloped as the regions lie at a great distance from the coast located export ports – more significant for bulky commodity exports such as nickel, coal and iron ore. Existing infrastructure networks provided only the most basic foundation – if that – for the economic exploitation of the resources. The cost of refurbishment or new infrastructure delivery remains outside the financing capability of any one project and way beyond the existing reach of national budgets or donor offerings. This ultimately requires countries in the region to negotiate with investors (both mining and infrastructure) as a unit to enable critical synergies to be exploited to bring on stream a new generation of mining projects that have long been mired in the complexities of regional relationships.

2. Enterprises must be able to service business opportunities across borders without excessive barriers as the nature of servicing often uneven demands of mining companies requires a reach beyond one customer. The formation of the East African Common Market is a major advance in this regard. However, the dysfunctional infrastructure networks as well as bureaucratic obstacles continue to undermine the potential that does exist.

Policy integration is critical.

To investors in the mining sector it does appear that there is some confusion with regards to objectives around foreign direct investment in Tanzania which is not as widely reported in Mozambique. In Tanzania the relationship between Mining Development Agreements (agreed with the Ministry of Energy and Minerals) and revenue protocols with the Ministry of Finance and Economic Affairs was the subject of some sustained disagreement has led for a period of time to the withholding of VAT returns to mining companies. Beyond this the investment priorities of the Ministry of Infrastructure Development do not always seem in alignment and further there is not much recognition of the needs of the mining sector in these processes. Roles of other structures such as the National Development Corporation and the Tanzanian Investment Centre in relation to securing a coherent approach also seem somewhat unclear.

¹¹ Cost issues arise not only in terms of direct costs related to service charges but often as much because of high levels of failure causing resultant costs to enterprises and households (for example the loss of stock in cold store from an electricity outage).

Although the mining companies have considerable resources they still struggle with complex and often outdated bureaucratic procedures that, whilst they might raise revenue for the government, often impose costs on business which reduce growth prospects. All in all the mining companies approached suggested that there was more than a degree of ambivalence around the presence of mining TNCs in the country. The argument raised here was that this meant that many potential policy connections were not being made and opportunities were being lost. To a large degree the companies felt that they were going it alone when working on linkages and other initiatives such as the skills centre in Dodoma. A further issue raised here was the unwillingness of the donor sector to want to be seen to be associated with the mining sector because of the perceived ambivalence of the government and the concerns about negative publicity related social and environmental issues. In this regard the donor community (a major player in financing the Country's budget) was not seen to be an effective partner in trying to deepen domestic connections with the mining sector. Although linkages is reflected as an issue in some policy documents there is not any particular single entity driving it as a core mandate when it comes to the minerals sector. Mining companies also indicated that having a more effective and credible enterprise support environment would be of major assistance as they could not take responsibility for all the upgrading needs of local SMEs or their financing needs.

The experience of Mozambique is one where government has sought to strategically support what are seen as mega projects. The government's experience has been that linkage programmes such as that associated with the Mozal aluminium smelter can play an important role in securing a wider set of benefits from FDI. Government has also had considerable exposure to public-private collaborative infrastructure projects such as the Port of Maputo and the Maputo Corridor linking the country with the South African economic hinterland. This experience has been brought to the table in the Zambezi Valley processes where the sense is that the government is showing a great degree of political will in support of large-scale mining developments in the area.

More than just increased spending on infrastructure is needed.

The last few years have seen a sustained drive to direct more Official Development Assistance (ODA) and domestic revenue sources to investment in infrastructure. In fact it is noted by all the respondents approached in this study that the investment can be seen in a number of major road projects as well as in some management modernisation attempts such as those around the port and the rail system. However, in absolute terms the incremental increases in investment remains a major concern and in some cases – such as the main hinterland rail line from Dar es Salaam – the functionality of infrastructure remain an issue because of the major scale of investment backlogs. Management contracts and the like might solve some of these challenges but ultimately some hard choices need to be made to upgrade priority infrastructure and its management in a manner that could sustain mining investment, secure new projects **and** enable local enterprises. Mozambique has displayed a strong interest in exploring a variety of mechanisms to generate investment in its infrastructure networks and this is well demonstrated in this study. However, in both cases this must be accompanied by sustained efforts around the softer issues of management and maintenance that are an irritant to mining companies but are often

a business killer for small enterprises. It should also be noted that the type of infrastructure investment that would be a priority varies by type of mining activity. So for some road networks count for more whilst for others rail systems need to be working.

A corridor must offer tangible benefits and not just be a talk shop.

The Central Development Corridor exists in a skeleton institutional form, is referenced in some major policy documents and has some recognition as a work-in-progress from non-government stakeholders. However, there has been some waning of the influence of the corridor concept in policy as it was associated much with the administration of Benjamin Mkapa and Thabo Mbeki's continental crusading under the NEPAD banner. Although the National Development Corporation still has a Corridor directorate it is not clear if there is real backing from influential government leaders and those in the mining sector suggested that there appeared to be little in the way of substance behind plans. However, some ongoing commitment to the concept by donors such as DFID – a funder of a recent diagnostic exercise suggests that it might make something of a policy comeback – in particular because of the growing influence of regional integration processes such as the East African Community (EAC). The experience of the highly successful Maputo Corridor has given stakeholders in Mozambique direct experience in a well functioning corridor institution that has yielded important economic gains for the country.

Small businesses must be supported otherwise linkage prospects are limited.

In a relatively short space of time Tanzania has gone through some major economic policy reforms. Under previous policy regimes the role of private enterprise was seen to be somewhat limited. However, reforms in policy have seen a burgeoning private enterprise sector in the economy – although many enterprises remain marginal, largely informal and servicing very localised markets. Despite the low capacity of the majority of enterprises there is a category of relatively well established small and medium domestic enterprises that has shown the capacity to perform domestically and in some cases beyond. However, study after study has shown that the policy environment in Tanzania remains one of the most unfriendly in the region to business. In particular performance around the constraints from poor infrastructure are seen to hamper business alongside lengthy delays in processing business documentation and the like. Attention to the business climate in Mozambique has also had some shortcomings that are likely to constrain linkage potential, however, business climate surveys show that a number of these have received ongoing attention.

1.2 Organisation of the report

This report begins with an overview of Tanzania in the East African context paying particular attention to the emergence on mining and infrastructure matters as explored through the corridor processes initiated under the NEPAD banner in the late 1990s. This is followed by a review of selected literature examining issues of infrastructure in developing economies and attempting to draw in material, largely from other fields on corridors. The next section provides some information on the

study method and key research questions. This is followed by a discussion of the field work findings. In section six an attempt to provide some analysis informed by the literature and fieldwork is made. Section seven seeks to explore any insights the study might be able to glean from the comparison of the emerging Mozambique case. Section eight provides a conclusion and some reflection on policy implications and broader issues raised by the report.

2 Background: Tanzania and the Central Corridor in the East African context

The section provides some important background relevant to the study. The material provides some insight into Tanzania's position in the broader East African context with a specific focus on infrastructure and minerals resources issues. Tanzania has the second largest economy in the East African region. The dominant economic player is Kenya which has been the major recipient of investment and has been the most significant exporter. However, the past decade has seen Tanzania emerge as an increasingly significant and strategic economic player as its economy has stabilised and begun to show impressive growth and because of the imperative for neighbouring land-locked countries to be linked with trading opportunities through enhanced transport infrastructure. However, it is important to note that the character of neighbouring economies differs quite substantially. During the colonial era, under the East African Community, regional manufacturing and distribution businesses were concentrated in Kenya with the result that Tanzania had very little direct exposure to these activities. These historical agglomerations continue to have an important impact on the character of the different economies today (UNCTAD, 2009).

Table 1. 2009 Country data for Tanzania and neighbouring countries

Category	Tanzania	Kenya	Uganda	Rwanda	Burundi	Mozam.	Zambia	Malawi	DRC
Population (m)	43.7	39.8	32.7	10.0	8.3	22.9	12.9	15.3	66.0
Pop growth - annual %	2.9	2.6	3.3	2.8	2.8	2.3	2.5	2.8	2.7
GDP (current US\$) (billions)	21.6	29.4	16.0	5.1	1.3	9.8	12.7	5.0	10.6
GDP per capita (current US\$)	509	738	490	506	160	428	985	326	160
GDP growth (annual %)	5.5	2.6	7.1	5.3	3.5	6.3	6.3	7.7	2.7
Life expectancy at birth, total (yrs)	55.6	54.2	52.7	50.1	50.4	47.9	45.4	53.1	47.6
Mortality rate, infant (per 1,000 live births)	68.4	54.8	79.4	70.4	101.3	95.9	86.3	68.8	125.8
Literacy rate, youth female (% of females ages 15-24)	76.3	92.9	85.5	77.1	75.3	62.1	67.5	85.0	61.8
Prevalence of HIV, total (% of population ages 15-49)	6.2		5.4	2.8	2.0	12.5	15.2	11.9	

(Source: www.worldbank.org accessed on 20 November 2010 and own calculations)

2.1 Tanzania’s economy

Despite the relative importance of the Tanzanian economy in the region in late colonial times and in the post-colonial era it was generally seen as an economy that was performing well below its potential. For many years under government policy that sought to seriously circumscribe private business activity and as a country with growing levels of international debt the economy hobbled along and per capita income declined¹². After a protracted crisis Tanzania adopted an economic reform package in 1986 under the World Bank’s Structural Adjustment Programme. During the following decade the average GDP growth rate rose to 4.6 percent. In 2000 Tanzania qualified for the Highly Indebted Poor Country initiative (HIPC) which in turn enabled the country to direct public revenue away from debt servicing towards social needs. This process was accompanied by a further phase of economic restructuring including the drive to raise FDI, especially in the mining sector related in part to conditions attached to the debt forgiveness arrangements under HIPC.

Today Tanzania is in the upper-middle ranking of African countries in terms of FDI, with its FDI stock rising from US\$2.78 billion in 2000 to US\$5.94 billion in 2007 (UNCTAD, 2009). Excluding African countries with oil and gas and South Africa the country was the best performer on the continent in terms of attracting FDI during the mid 2000s and over the period 2005-2007 Tanzania attracted more than double the FDI of its neighbor Kenya, traditionally a strong FDI-attracting nation in the region (UNCTAD, 2009).

Table 2. Tanzania’s FDI trends

Average 1990-2000	2005	2006	2007	2008	2009*
135	494	597	647	744	645

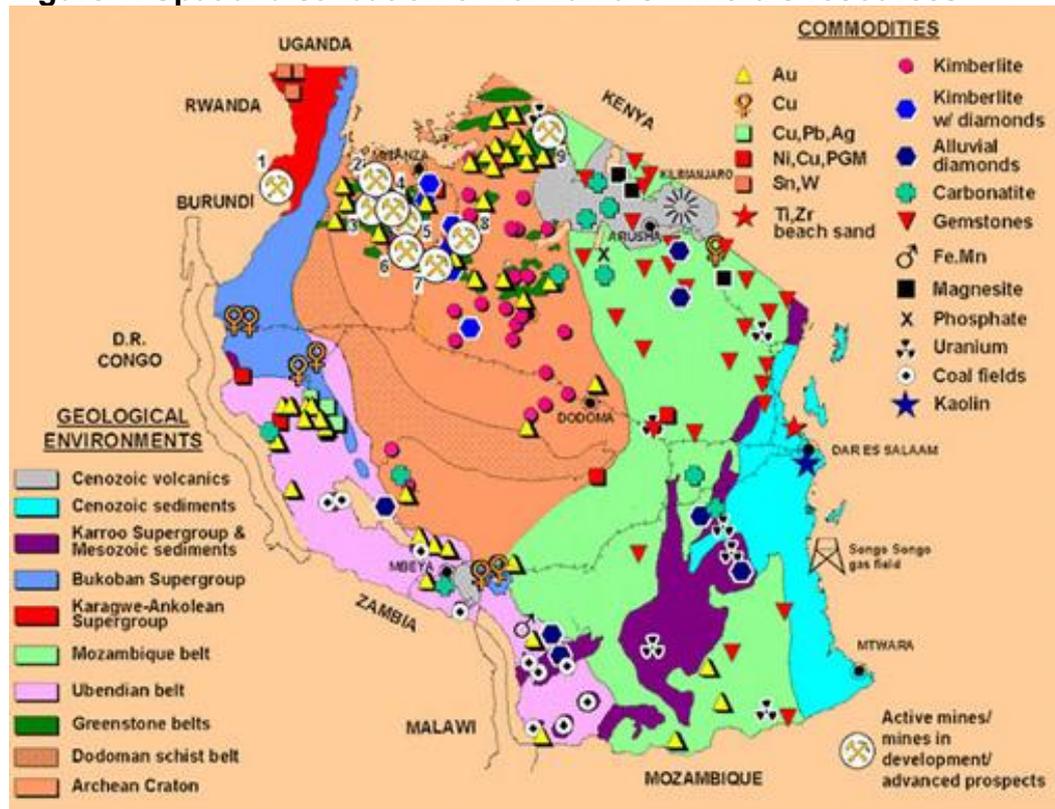
(Source: UNCTAD, 2009; www.unctad.org; *Tanzanian Investment Centre interview)

2.2 Mining in Tanzania’s economy

Mining has been of growing importance in Tanzania in the past decade. Reforms to government policy discussed above also witnessed changes in policy with respect to mining. Whilst there had been some private mine operators in the 1980s and early 1990s there was very limited major foreign direct investment. However, as commodity prices began to show stronger performance the evidence of the growing importance of the sector could be seen in the rising importance of the export of gem stones (such as Tanzanite) and gold. The widespread availability of mineral resources, not just in Tanzania, but in the region (as will be discussed later) provided an attractive context for investment interest with the most substantial interest being that of the gold sector concentrated mainly in the north-west of the country (see Figure 1).

¹² World Bank accessed from <http://info.worldbank.org/etools/docs/reducingpoverty/case/31/summary/Tanzania%20Country%20Study%20Summary.pdf> on 12 February 2011)

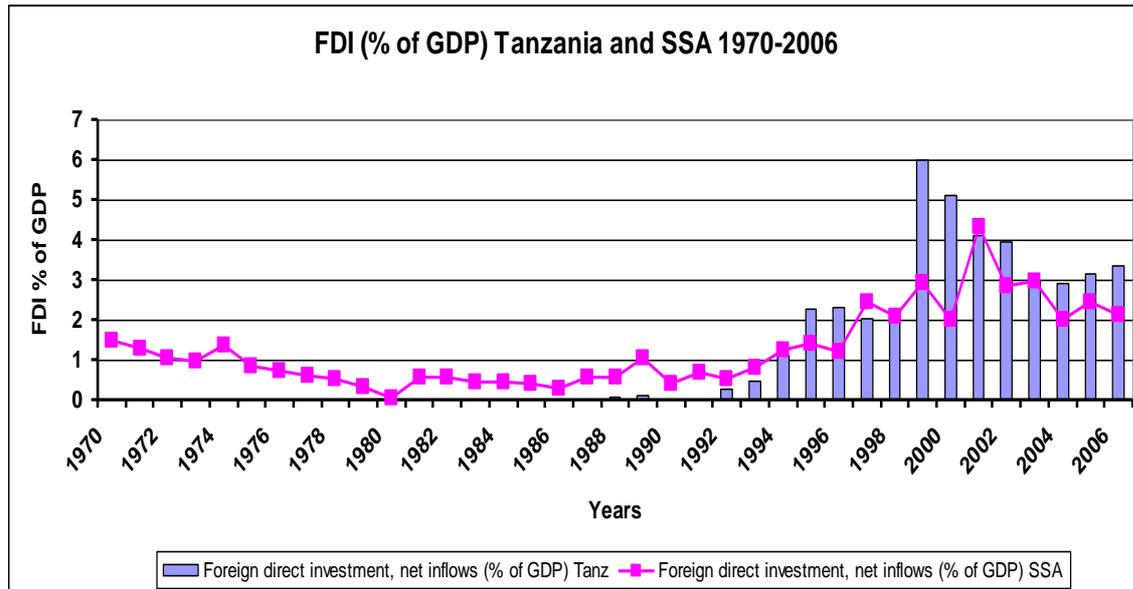
Figure 1. Spatial distribution of Tanzania's minerals resources



(Source: Msabaha, 2006: <http://siteresources.worldbank.org/INTOGMC/Resources/336099-1160575823247/tanzaniaminister.ppt> accessed on 3 December 2010)

In an environment of ongoing capital shortages in Tanzania and only limited exposure to mining expertise the country sought foreign investors to drive this process. The result of this was that FDI became in the period the dominant contributor to economic growth as the share FDI as a percentage of GDP rose significantly (Figure 2.) The overwhelming bulk of this FDI was in the form of investment from gold mining companies.

Figure 2. FDI as a percentage of GDP in Tanzania



(Source: Mjimba, 2010)

Since 1994 six new gold mines began operations (although some were rehabilitations of previous abandoned mines). These were:

- Barrick’s Bulyanhulu in Kahama, (operations began in 2001)
- Resolute’s Golden Pride in Nzega, (operations began in 1998)
- AngloGold Ashanti’s Geita in Geita, (operations began in 2000)
- Barrick’s North Mara in Tarime, (operations began in 2003)
- Barrick’s Tulawaka in Biharamulo, (operations began in 2005)
- Barrick’s Buzwagi in Kahama, (operations began in 2009).

The significance of this investment is illustrated by the fact that two thirds of growth in FDI stock since 2000 is accounted for by gold mining - more than US\$2 billion (World Gold Council, 2009). Today gold exports dwarf Tanzania’s traditional agricultural export crops.

However, this investment has not been without its challenges. In 2010 the government introduced a revised mining act (United Republic of Tanzania, 2010) which increased royalties in response to a widespread sentiment in Tanzania that the country was not securing the revenue it was due under the previous mining legislation. The passing of the new law had followed a protracted set of disputes around issues such as VAT rebates to the mining companies and political leaders made comments publically about the fact that the government needed to refocus on agriculture as its core activity and not be swayed by the interested of multi-national mining companies. Under these circumstance the international investment community identified a number of challenges that needed to be overcome to secure new investment and sustain existing commitments. Some of the constraints identified are captured in the graphic below (Figure 3) identifying issues such as infrastructure as being essential to enable the ongoing growth of the mining sector.

Figure 3. Graphic illustrating international investor perspectives on mining sector in Tanzania



(Source: <http://www.frost.com/prod/servlet/frost-home.pag> accessed on 9 December 2010)

2.3 Overview of the Central Corridor in the East African context¹³

While focused on the Central Development Corridor, it was necessary in this study to consider the corridor in its wider East African context. Because the Great Lakes hinterland of the Central Development Corridor is also serviced by the Northern Corridor from the maritime port of Mombasa on the southern Kenyan coast, the two corridors theoretically compete with each other and offer choice to the importers and exporters in their “footprint” states. Under ideal conditions this competition should result in efficiency gains through the provision of price competitive transport and logistics services. Moreover, the fact that areas of natural resource extraction may be supplied from or provide outputs into different regional centres of economic agglomeration, this may have a direct bearing on the development trajectory of economic linkages stimulated by natural resource investments. The following material provides an overview of the two Corridor areas.

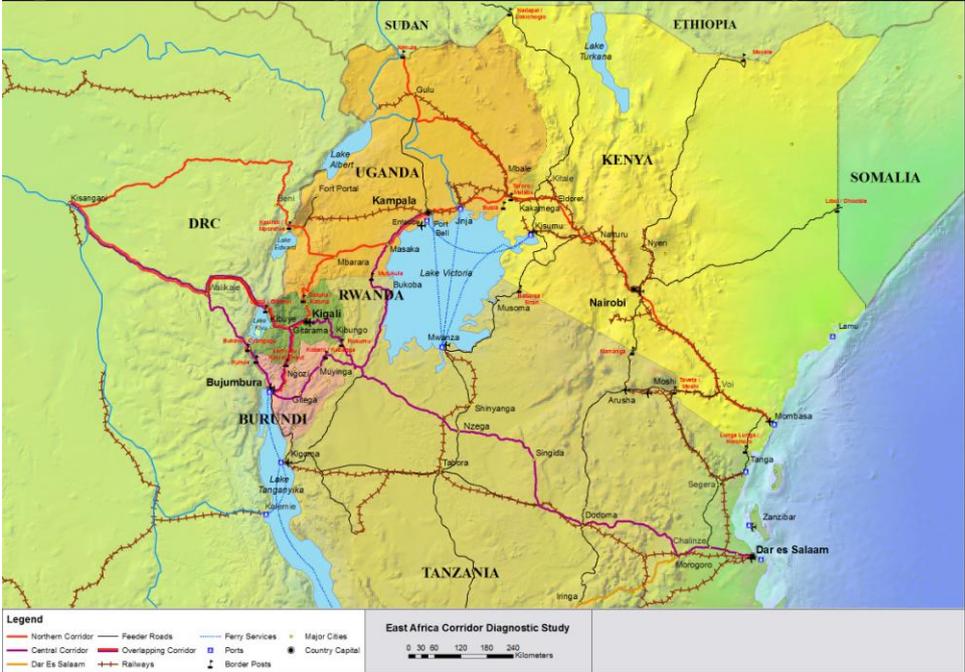
In East Africa, the Central and Northern Transport Corridors connect the people of the five East African Community (EAC) countries, namely; Burundi, Kenya, Rwanda, Tanzania and Uganda. Additionally, these corridors also provide access to the maritime ports of Dar es Salaam (Tanzania) and Mombasa (Kenya) to the people of the Democratic Republic of Congo and southern Sudan. National, regional and international trade along the corridors has a positive impact on the region and many initiatives have been undertaken to improve corridor efficiency, a key to improving the competitiveness of the regional economy. However, due to inadequate physical infrastructure and inefficiency, these corridors are characterized by long transit times and high costs. The cost of transporting goods in East Africa is 60-70 percent higher than in the United States and 30 percent higher than in Southern Africa and this is

¹³ Information in this section, obtained through relevant authorities, has been sourced from the East African Corridor Diagnostic Study (see www.eastafricancorridors.com), the Regional Spatial Development Initiatives Programme – Central Development Corridor) and the NCTTCA (Northern Corridor).

estimated to reduce economic growth across East Africa by one percent annually¹⁴. Modernization of transport infrastructure, harmonization of national policies and regional goals, and the removal of non-tariff barriers along these corridors is critical for trade expansion and economic growth, which are key to the success of regional integration as well as creation of wealth and poverty alleviation in the individual countries. In both cases, the exploitation of latent economic potential is currently severely constrained by infrastructure backlogs and inefficiencies.

Figure 4 provides geographic context and maps the main infrastructure elements of the Central and Northern Corridors in their East African context.

Figure 4. Location Map: Central and Northern Transport Corridors



(Source: Nathan & Associates, East Africa Corridor Diagnostic Study, 2009/10)

2.3.1 The Central Development Corridor

Connecting the Tanzanian maritime Port of Dar es Salaam with its Great Lakes hinterland, the Central Corridor is defined by three main constituent elements: its port, railway and road systems, all of which, together with border posts and major nodes of human settlement are depicted in Figure 5 below.

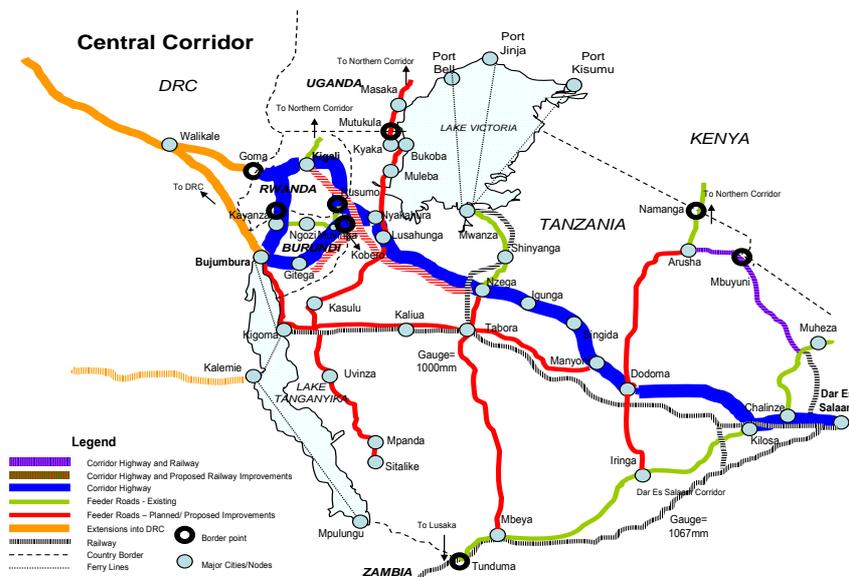
The Port of Dar es Salaam is linked by rail westwards via Dodoma and Tabora to Kigoma the principal lake port on Lake Tanganyika and a branch railway line runs from Tabora to Mwanza, the principal lake port of Lake Victoria. Kigoma is connected by lake shipping services to Bujumbura (Burundi) in the North, Kalemie (DRC) in the West and Mpulungu (Zambia) in the South. Likewise, Mwanza is connected to Port Bell and Jinja (Uganda), Kisumu (Kenya) and Bukoba in the Kagera region of north-east Tanzania – all via limited lake shipping services.

¹⁴ Trademark East Africa (TMEA) see www.trademarka.com accessed on 28 April 2011.

Road links also connect Dar es Salaam to Mwanza via Dodoma, Manyoni, Singida and Nzega and to Kigoma via Dodoma, Manyoni, Singida, Nzega and Tabora. A road also links Nzega via Rosumo Falls to Kigali in Rwanda from where the eastern DRC can be accessed by road via Gisenyi to Goma and via Cynagugu to Bukavu. The Corridor links Rwanda by road to Burundi via the Kigali-Bujumbura road.

Importantly, in terms of its catchment, the Central Corridor extends westwards into the DRC via four points, namely: firstly, by lake from Kigoma to Kalemie, the railhead to the Katanga province; secondly, by road (north-west) from Kigali via Gisenyi to Goma, the principal town in North Kivu province; thirdly, by road from Kigali via Cyangugu to Bukavu, the principal town of South Kivu province; and, fourthly by road to Bujumbura across the lake to the secondary port of Uvira that is also connected to Bukavu by road. From Goma and Bukavu, the Central Corridor links to the DRC town of Walikale and from there potentially to Kisangani on the Congo River.

Figure 5: The Central Corridor



(Source: www.eastafricancorridors.org (accessed on 7 October 2010))

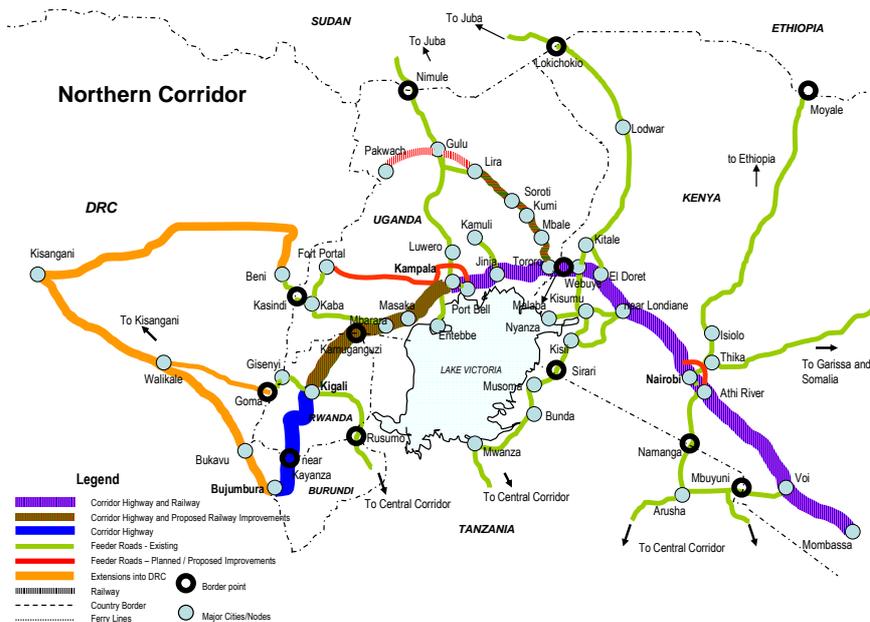
2.3.2 The Northern Development Corridor

Connecting the Kenyan maritime Port of Mombasa, the Northern Corridor is linked by road and rail to Uganda and from there by road to Rwanda, Burundi and the eastern DRC. The main elements thereof together with border posts and major nodes of human settlement are depicted in Figure 6 below.

The Port of Mombasa is linked by rail to Nairobi (with a spur to the Lake Port of Kisumu) in Kenya and Kampala in Uganda. While the rail network historically extended within Uganda to Pakwach and Kasese both adjacent to the DRC border, these lines are not operational at present. The road links from Mombasa, through Nairobi, Kampala, Kigali and Bujumbura define the backbone of the corridor today with road transport dominating traffic along the corridor. From the Kenyan lake Port of Kisumu, lake shipping services routes to the Tanzanian and Ugandan ports of Mwanza and Port Bell respectively. Lastly, a fuel products pipeline extends from the

Port of Mombasa to the town of Eldoret in Kenya form where fuel is distributed to the landlocked States of Uganda, Rwanda and Burundi.

Figure 6. The Northern Corridor



Source: www.eastafricancorridors.com (Accessed on 10 October 2010)

2.3.3 Corridor Institutions and Initiatives

Principally from a transport infrastructure perspective, but increasingly more holistically, there are a number of key corridor institutions and related initiatives that are designed to promote and facilitate improvements in corridor infrastructure, the management thereof and the promotion of new investments on the corridors. A select number of these are described in brief below.

The Central Corridor Transit Transport Facilitation Agency (CCTTFA)¹⁵ is a multilateral management and coordination agency established in 2006 by the governments of Burundi, Democratic Republic of the Congo, Rwanda, the United Republic of Tanzania and Uganda to facilitate transit trade. The Agreement to establish the Central Corridor Transit Transport Facilitation Agency (CCTTFA) was signed on 2nd September, 2006 in Dar es Salaam, Tanzania by the five Ministers responsible for transport matters in the Member-States and outlines the modalities of this cooperation.

The scope of the CCTTFA covers the corridor transport and logistics systems which include: The Port of Dar es Salaam, the Tanzania Railways Lines from Dar to Kigoma for Burundi and Eastern Central DRC; to Isaka for Rwanda, Burundi and

¹⁵ The CCTTFA is formed in recognition of the right of landlocked countries (LLC) to transit trade as declared under specific United Nations General Assembly Resolution 56/180 on particular needs of landlocked developing countries from which other declaration and Action Programs evolved such as The Almaty Declaration.

Eastern Central DRC; to Mwanza for Uganda; it also includes Lake Tanganyika and Lake Victoria; all roads connecting the above countries along Central Corridor.

The main objectives of the CCTTFA, amongst others, are to:

1. Ensure that the routes under the Agreement are available for use by Member-States efficiently and economic additional routes to their current trade routes.
2. Monitor route performance through the proactive collection, processing and dissemination of transport data in order to support the planning and operations of the Member-States;
3. Encourage coordination and cooperation among the many players in the transport industry among the Member-States;
4. Monitor costs and encourage reduction of transport and logistics costs associated with transportation of goods along the corridor.
5. Market the corridor for its increased utilization and market share.

The governing structure of the CCTTFA is made up of the following organs: an interstate council of ministers; an executive board; a stakeholder's consultative committee and a permanent secretariat. The inter-state council of ministers is the highest authority and is responsible for coordinating CCTTFA's policy issues. It also facilitates and effects harmonization of policies agreed to by member States.

The CCTTFA secretariat, which is headed by an executive secretary and based in Dar es Salaam, is responsible for coordinating the implementation of decisions and resolutions resolved by the CCTTFA's governing bodies. The African Development Bank provided the secretariat with a start-up grant of US\$ 1.8 million over three years, starting from January 2007. The secretariat is developing its own self-financing mechanism.

With regard to the Northern Corridor, conscious of the need to cooperate with a view to facilitating their interstate and transit trade, the member States of Burundi, Kenya, Rwanda and Uganda negotiated and signed the Northern Corridor Transit Agreement (NCTA) in 1985. The NCTA entered into force on 15 November 1986, following its ratification by all the four contracting States. Later, on 28 May 1987, Zaire (now the Democratic Republic of Congo) acceded to the NCTA, thereby becoming the fifth contracting State. In order to ensure implementation and compliance with the provisions of the NCTA, the Transit Transport Coordination Authority (TTCA) of the Northern Corridor was established to coordinate implementation of the Agreement and to carry out decisions and resolutions reached by the policy organs of the Authority.

During its 15th Meeting held at Bujumbura in 2003 and in recognition of the economic development potential that lies along the Northern Corridor, the Northern Corridor Transit Transport Coordination Authority (NCTTCA) was mandated by its governing structure, the Council of Ministers, to transform the Northern (transport) Corridor into an economic development corridor. The Secretariat of the NCTTCA was mandated

to pursue the initiative using the spatial development initiatives methodology already in application at the time in the SADC region.

The new Northern Corridor Agreement signed in Nairobi, Kenya on 7th October, 2007 contains provisions enabling the corridor countries to collaborate in the transformation of the Northern Corridor into an economic development corridor. Furthermore, the NCTTCA has accorded the development corridor initiative high priority in its Five Year Strategic Plan (2007-2011), by making the transformation of the Northern Corridor into an economic development corridor as one of its strategic objectives.

The NCTTCA's vision is to contribute to sustainable social and economic development of the NCTTCA Member States through an integrated transport system that promotes national, regional and international trade. Its mission, notably, is to transform the Northern Corridor into an economic development corridor that offers international competitive transit transport services, promotes national and regional trade and integration, and provides opportunities for private sector investment along the Corridor.

The NCTTCA's objectives are:

1. To promote Northern Corridor use as the most effective transport network for surface transport of goods between the member countries and the sea,
2. Ensure that member states
 - a. grant each other the right of transit in order to facilitate movement of goods through their respective territories and
 - b. provide all possible facilities for traffic in transit between their territories.

In line with its expanded mandate to transform the Northern (transport) Corridor into an economic development corridor, the NCTTCA has mobilized support from the NEPAD Secretariat to assist with this transformation. A series of stakeholder workshops have been held and an in-depth scoping study carried out to determine the underlying economic rationale for the Development Corridor, to appraise of some of the anchor investment projects that could drive the economic development process and to determine whether or not to employ the Spatial Development Initiative (SDI) methodology¹⁶ to promote corridor development. This study also examined the functional economic linkages between corridor States and southern Sudan and Ethiopia.

2.3.4 The Business Case for the Central Corridor

The Central Development Corridor Spatial Development Initiative (SDI) is currently being implemented under the auspices of the Tanzanian and Rwandan governments. The institutional arrangements for CDC SDI are detailed in an agreement signed on the 14th January 2005 between the Minister of Infrastructure Development in the United Republic of Tanzania and the Minister of Commerce, Industry, Investment

¹⁶ During the 1990s South Africa's government introduced Spatial Development Initiatives as a tool to focus public investment to generate significant new scale private investment.

Promotion, Tourism and Co-operatives in the Republic of Rwanda. Although, Burundi and the DRC are not signatories to the agreement¹⁷, representatives of these two governments have participated in CDC SDI processes and in certain key economic sectors, the work of the SDI has included coverage of the Burundian and eastern DRC economies.

The stated intent of the agreement is to achieve the following objectives:

- Achieve sustainable socio-economic development and integration by unlocking the underdeveloped potential in the corridor area;
- Develop adequate, reliable, cost effective, efficient and seamless transport, telecommunication, and energy systems so that the corridor is competitive;
- Foster and catalyze the involvement of public-private sector partnerships for the development of agro industrial, manufacturing, tourism, mining and service sectors;
- Re-orient the corridor trade and investment through the promotion of human settlement, minimize rural-urban migration, alleviate poverty and strategically position economic activities concerned into the mainstream of global trade;
- Promote smooth interstate trade and investments in order to create job opportunities and enhance the people's standard of living; and,
- Facilitate the mobilization of local and international resources to augment government capacities to speed up corridor development.

Since 2005, a considerable amount of work has been done in the major economic sectors, such as mining, agriculture, forestry, fisheries and tourism and in the transport and energy sectors to develop a better understanding of the key economic and infrastructure drivers of future corridor development. In the process a number of key "anchor" investment projects have been identified that will, if realised, provide a platform for more diversified economic growth and development.

The role of "anchor" projects is considered a necessary cornerstone of any attempt to develop the Central Corridor as a Development Corridor (in this case employing the SDI methodology) for a number of reasons: firstly, as large-scale of niche investments they boost economic growth; secondly, they typically diversify the economic base away from a dependence on agriculture; thirdly they are usually funded or co-funded by FDI inflows necessary overcoming inadequate levels of domestic savings to fund investment; fourthly, they help to expand exports and generate foreign exchange required to pay for imports; fifthly, they often involve significant transfer of skills and technology and finally they aim to create jobs and income for local people.

¹⁷ The CDC SDI agreement provides for the accession by other corridor countries. With increasing political stability in Burundi and the eastern-DRC conditions are increasingly favourable for the incorporation of these countries as part of the CDC SDI

Typically, economically viable “anchor” investment projects (or clusters of projects) and/or trade flows which are underpinned by “anchor” projects, also create the revenue streams that make financing the development and maintenance of necessary infrastructure economically viable (often under PPP arrangements). In turn the development of large-scale, fit for purpose, cost-effective and efficiently managed infrastructure, can reduce the cost of doing business on the corridor providing a springboard for a range of secondary private sector investments and related infrastructure developments that were previously not viable. As investments are “crowded-in” and “densification” often based on the exploitation of backward and forward linkages to the “anchor” investments takes place, the possibility of the development of a diversified platform for economic development is enhanced.

The economic history of the development of Africa and many of its major transport arterials, particularly rail, reflects the colonial imperative to move large quantities of mainly mineral commodities from the deep hinterland to the coast. More often than not, major transport infrastructure that was developed in this period served other sectors and social needs to a very limited degree. Enclave development was the inevitable result.

Ironically, against this background, it is the minerals sector (and often only this sector) that can adequately support the economic rationale for the development of major new infrastructure (or even the rehabilitation of existing infrastructure) in a context where governments simply do not have the revenue streams to fund major projects or where borrowing the necessary funds is highly unrealistic. Even large-scale agricultural projects cannot generate the revenue streams that are necessary in order to amortise the capital development costs of major transport or energy infrastructure (in part because the rents for many agricultural products are depressed due to subsidies in the Developed Countries such as those in the European Union Common Agriculture Policy). Furthermore, the case for tourism led infrastructure development can really only be made at a local level and is of little relevance as the principal economic driver of demand for large-scale infrastructure. Instead, agriculture and tourism are sectors where investment and enterprise development are enabled by large-scale trunk infrastructure investments associated with mining development.

For these reasons, the decision to adopt the SDI methodology on the Central Corridor was based on the potential role that the mining and minerals processing sectors could play in providing a platform for economic development within a corridor planning framework in Tanzania. The initial focus of building the business-case for the Central Development Corridor SDI was around framing the minerals and minerals beneficiation potentials of the region, which had the potential to provide the revenue streams for the required investment in transport, power and communications infrastructure. Particular attention has also been devoted to identifying the scope for the corridor to generate positive developmental impacts and more diversified development through secondary investments in other economic sectors. It is acknowledged by public sector stakeholders that without a concerted effort to ensure this outcome, the danger exists of merely perpetuating a dependence on the extraction and export of unprocessed minerals.

At the core of the Central Development Corridor business case are three main drivers of development, namely:

- increasing regional trade along the Central Development Corridor through the Port of Dar es Salaam to and from DRC, Rwanda and Burundi as the security situation improves;
- stimulating exploration and the development of minerals deposits throughout the corridor area; and
- ensuring that the provision of infrastructure (particularly in the transport and energy sectors) to service mineral developments also enables the realisation of investment potential in other sectors, particularly agriculture, tourism and manufacturing.

The remainder of this section will consider key features of these three elements of the Business Case.

Regional Trade Growth

Despite a rising population and with it, an increasing demand for goods and services throughout the CDC catchments area, there has not been a corresponding growth in and improvement of rail or lake transport services. Most of the rail and lake ports infrastructure was constructed in the early to mid 1900's and investment has been insufficient to either maintain the existing system, or add new capacity needed to accommodate organic growth. This has resulted in a generally dilapidated rail and lake transport network characterised by inefficiency, unreliability, inconvenience and delay.

Accordingly, almost 95% of all transit cargo through the CDC gateway port at Dar es Salaam is currently carried by road, which in terms of tonne-kilometre cost is typically 100% to 150% more expensive than comparative rail/lake systems. This has pushed up freight rates, which as a percentage of import value in Sub-Saharan Africa averaged 13.8 percent in 2001 more than double the world average of 6.11 percent. This means that the cost of transport can be many times more expensive when compared to world averages, inflating the price of imports and undermining export competitiveness.¹⁸ These costs are compounded when the effects of congestion and delay are added to the total freight bill, reaching up to 40 to 50% of import value in parts of Tanzania, Rwanda, Burundi and the Eastern DRC.

Scarce, poor or inefficient infrastructure also leads to very high inventory cost in the agriculture, mining, manufacturing and tourism sectors, resulting in missed opportunity and deterring foreign direct investment. In the eastern DRC, one of the richest mineral resource regions in the world, there is a direct link between limited access to infrastructure and deteriorating security, social and economic conditions. In order to reverse this situation, transport, trade and transit systems will need to be

¹⁸ Data in this section is sourced from East Africa Corridor Diagnostic Study (Nathan and Associates, 2010 and interviews with CDC team.

overhauled¹⁹ if they are to meet the challenges posed by the recent increase in and anticipated massive growth in regional trade flows.

In 2007 the total throughput through the Port of Dar es Salaam was estimated to be 7.12 million (harbour) tonnes²⁰ of which 76% were imports. The container trade is the fastest growing and the largest in terms of both volume and value, accounting for some 3.26 million tonnes (or 334 000 TEU's). Bulk liquids accounted for 2.19 million tonnes, dry bulk 1.16 million tonnes and general cargo 0.52 million tonnes. Transit traffic through Dar es Salaam to neighbouring states amounted to 2.05 million tonnes (or 28.8% of total traffic) in 2007 and a breakdown of transit volumes by country and type of goods is presented in Table 3 below.

Table 3. Transit Traffic Through Dar es Salaam in 2007 ('000 tonnes)

Country	Liquid Bulk Imports	Dry Bulk/ Break Bulk			Containers ('000 TEU)			Total	%
		Imports	Exports	Total	Imports	Exports	Total		
Zambia	602	239	159	398	17.9	10.6	28.6	1021	49.9
DRC	129	318	95	413	16.8	2.8	19.6	556	27.2
Malawi	67	44	6	49	2.5	0.5	3.0	118	5.8
Burundi	41	79	22	101	14.2	3.8	18.0	156	7.6
Rwanda	0	75	8	83	6.0	1.1	7.1	89	4.3
Uganda	1	32	3	36	2.5	0.1	2.6	38	1.9
Other	68	20	0	0	0.0	0.0	0.0	68	3.3
Total	907	807	293	1080	59.9	19.0	79.0	2046	100.0

(Source: Royal Haskoning, Tanzania Port Master Plan, 2008)

The prominence of Zambia in the data reflects the importation of crude oil through the TAZAMA pipeline. Aside from that, the dominance of imports – 74.7% of dry bulk imports and 75.8% of the container trade - is notable. When viewed in the context of the traffic volumes that the Port of Dar es Salaam and the corridor infrastructure linking it to its deeper hinterland carry it is clear that the Central Corridor is a significant economic lifeline for the hinterland States.

While cargo volumes passing through the Port of Dar es Salaam have shown significant growth in the 2000's, with dry bulk volumes more than doubling, liquid bulk increasing 5.2% per annum and container traffic increasing 14.5% per annum over the period 2001 to 2007²¹, transit country traffic has also been increasing as a percentage of total traffic through the Port of Dar es Salaam over the same period. For example container transit traffic has increased from 25% of all container movements through the port in 2001 to 39% in 2007²².

The Tanzania Port Masterplan (Royal Haskoning, 2008) makes projections for future growth in trade based on a comprehensive analysis of the Port of Dar es Salaam's hinterland economy. Future freight forecasts anticipate a growth of transport demand

¹⁹ This is the focus and core business of the CCTTFA described previously.

²⁰ Source: Tanzania Ports Authority as quoted in the Tanzania Port Master Plan (Royal Haskoning, 2008)

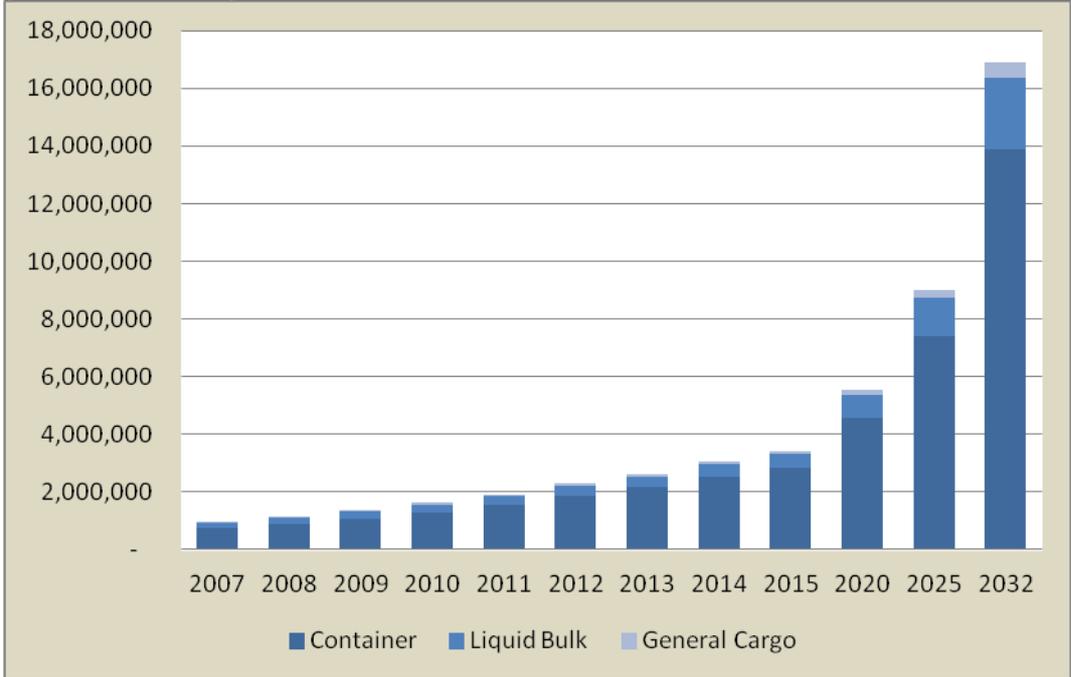
²¹ Source: Royal Haskoning, Tanzania Port Master Plan, 2008 – p.5-4

²² Source: Royal Haskoning, Tanzania Port Master Plan, 2008 – p.5-5

of over 340% by year 2015 and of over 1000% by year 2032. Growth is also expected to be most pronounced in the container trade, which currently accounts for 75.5% of all transit volumes through the port of Dar es Salaam to Burundi, the DRC, Rwanda and Uganda. By year 2032, container cargo is expected to account for over 82% of all hinterland trade.

Figure 7 below illustrates the forecasted future configuration of transit trade flows by type for the Central Development Corridor transit countries.

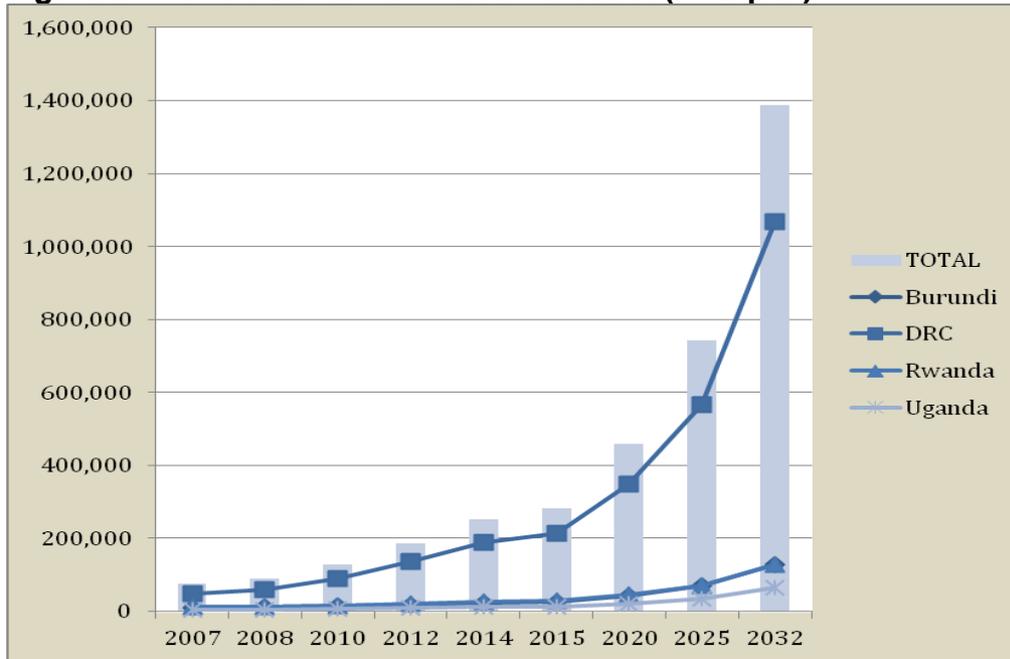
Figure 7. Transit Trade Forecast by Type: Burundi, Rwanda, the DRC & Uganda (harbour tones)



(Source: Marine Logistics Ltd, Integrated Transport Strategy – Lakes Tanganyika and Victoria, February 2009 as adapted from Tanzania Ports Master Plan, 2008)

Based on the projected throughput volumes at Dar es Salaam port, unhindered transit traffic demand to Burundi, the DRC, Rwanda and Uganda is expected to grow from a level of approximately 990,000 harbour tonnes (2007) to some 3.4 million tonnes in 2015 and some 16.9 million harbour tonnes in 2032. Containerised cargo is expected to make up the most of these volumes, especially trade to the DRC, potentially the largest and fastest growing transit country user of Dar es Salaam port. When measured in Twenty-Foot Equivalent Units (TEU), transit traffic demand (including transport of empty returns) is forecasted to grow from some 75 thousand TEU (2007) to over 282 thousand TEU by 2015 and close to 1.4 million TEU by 2032. Figure 8 below reflects these anticipated trends.

Figure 8. Transit Container Trade Forecast (TEU p.a.)



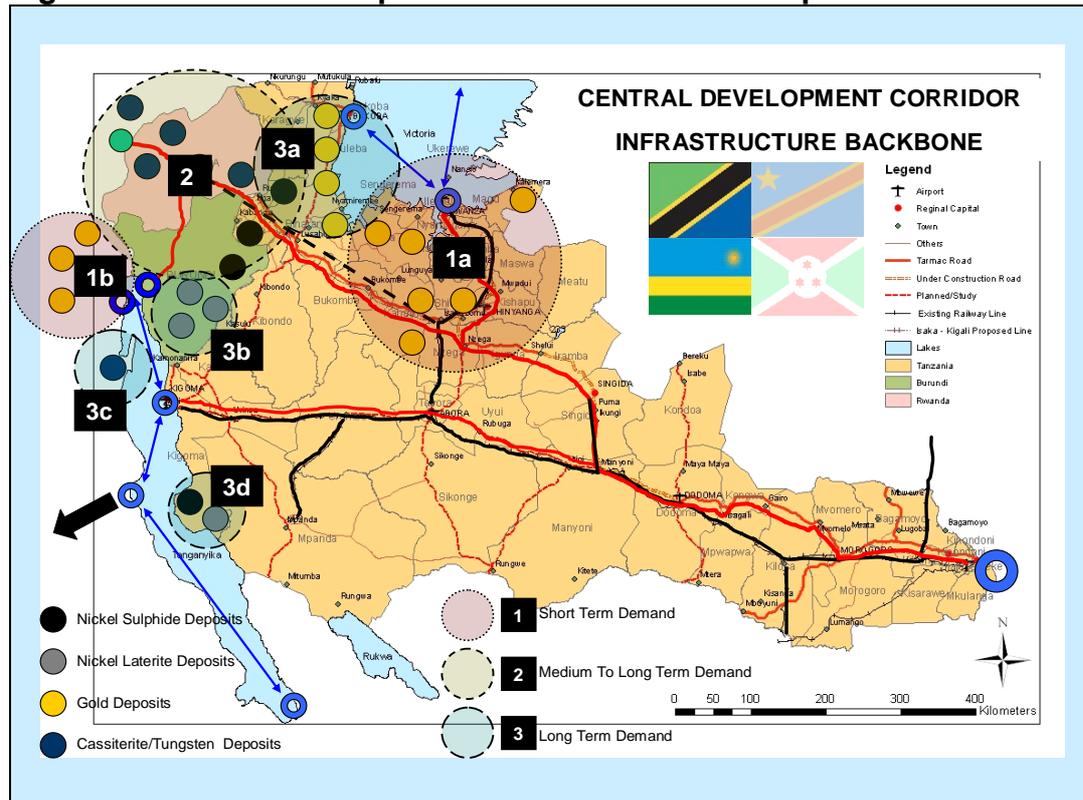
(Source: Marine Logistics Ltd, Integrated Transport Strategy – Lakes Tanganyika and Victoria, February 2009 as adapted from Tanzania Ports Master Plan, 2008)

In addition to the above transit trade volumes originating at Dar es Salaam port, inter-regional and domestic trade on Lake Tanganyika is expected to grow from a level of 60,000 tonnes in 2007 to over 130,000 tonnes in 2015 and close to 700,000 tonnes by 2032. Similarly, on the Southern (Tanzanian) portion of Lake Victoria, domestic trade is expected to grow from a level of about 250,000 tonnes in 2007 to approximately 520,000 tonnes in 2015 and close to two million tonnes by 2032.

Minerals Sector Anchor Projects

Forecast regional trade growth is based on a consideration of prospects for economic growth in what is a regional economy well endowed with a range of as yet largely unexploited natural resources. In the minerals sector the existing Tanzanian gold mines, two major nickel sulphide mines in north-west Tanzania (Kabanga) and Burundi Murumera), one new gold mine and two further gold prospects being developed in South Kivu in the DRC by Banro, three lateritic nickel mines in Burundi, a number of coltan, tungsten and cassiterite mines in North and South Kivu in the DRC and a number of new gold prospects in north-western Tanzania when viewed in aggregate could generate massive new demand for transport and energy infrastructure on the Central Development Corridor. Figure 9 below illustrates the location of the nickel, gold, tin and tungsten deposits within the geographic catchments served by the CDC infrastructure networks.

Figure 9. Central Development Corridor Minerals Deposits



(Source: Regional SDI Programme – CDC Draft Strategy, March 2009)

Through a series of specialist techno-economic studies into the prospects for the development and realization of the Corridor’s minerals development potential over the short, medium and long-term, the Central Development Corridor SDI process has made a strong case of the imperative to develop an infrastructure response in the region to match the timing of the proposed mineral investments. An exercise was conducted to estimate the anticipated timing of various mine development opportunities, the expected volume of output of each mine, the required volume of inputs to commission each mine and keep it operational, the envisaged volume of exports from each mine and the amount of electricity that each mine requires to ensure integrity of its production process. A summary of the outcome of this exercise is presented in Table 4 below.

Table 4. Mineral commodity output projections and estimated power needs

Timing*	Output (tpa)	Imports (tpa)	Exports (tpa)	Power Rqmts
Short Term	N/A	32,000	5,500	235 MW
Medium Term	500,000	251,000	577,750	100 MW
Long Term	8,200,000	2,725,700	662,500	272 MW
TOTAL	8,700,000	3,008,700	1,245,750	607 MW

* S/Term= > 3 years; M/Term= 3-7 years; and, L/Term= < 7 years to implementation.

(Source: CDC Draft Strategy, adapted from SSI Consortium, Letlapa Consulting 2008)

What is immediately evident is that even if allowances are made for significant possible variations in the timing of the various mineral development opportunities, the input and output volumes associated with these potential investments have

substantial implications for the development of corridor port, rail, energy, water and road infrastructure of the Central Development Corridor. It is clear that there are a range of potentially realisable mineral development opportunities that could create sufficient demand to make necessary enabling investments in that infrastructure economically viable. It is for this reason that the CDC has had as its focus the identification and securing of a critical mass of investment commitments that will provide the required freight volumes and therefore revenues that make the funding of necessary large-scale infrastructure projects a possibility.

Enabling Large-Scale Infrastructure

Given the current state of Central Corridor transport and energy infrastructure, the Central Development Corridor SDI advocates a common vision of the need for a holistic infrastructure development strategy that will create an integrated port, road and rail “backbone” to enable the seamless movement of goods along the Central Development Corridor. This will not only require a co-ordinated institutional response from public and parastatal institutions in the corridor States, but also close collaboration with private sector sponsors and developers of economic anchor projects on the Corridor.

Work already undertaken as part of the Central Development Corridor SDI process has identified many of the infrastructure development challenges on the corridor in a high level of detail. However, for the purpose of this report only a few of the major and necessary infrastructure developments are listed below²³:

- Development and expansion of the infrastructure at the Port of Dar es Salaam to accommodate anticipated growth in traffic, improvement of port services and increased private sector participation where appropriate;
- Rehabilitation and re-development of the Dar es Salaam-Tabora-Kigoma and Tabora-Shinyanga-Mwanza railway lines, firstly to restore operations that ceased following damage caused by floods in December 2009 and secondly to enable the movement of mineral exports in the medium-term;
- The possible integration of the existing railway with a new railway from Isaka (Tanzania) to Kigali (Rwanda) and from Keza (Tanzania) to Gitega and on to Musongati (Burundi);
- The further development of missing links in the paved road from Dar es Salaam to the Rwanda and Burundi borders;
- The redevelopment of the road bridge at Rusumo Falls on the border between Tanzania and Rwanda;
- The restoration of lake shipping services, lake port infrastructure and navigation systems on Lakes Tanganyika and Victoria;

²³ All of these “elements” of a wider CDC SDI infrastructure development strategy are either investigation by the responsible public sector agency, and/or, are subject of donor support to determine feasibility.

- The development of a power sector strategy to secure a reliable supply of power to unlock large-scale mineral and minerals processing project

As was noted above, the provision and of necessary infrastructure to enable the realization of economic opportunity on the Central Development Corridor also requires a consideration of the institutional arrangements for the provision and operation of parts of that infrastructure system. Nowhere is this challenge brought into sharper relief than it is with regard to the Tanzanian railway system.

Tanzania Railways Limited (TRL) is a private firm resulting from the concessioning of Tanzania Railways Corporation (TRC) which was formed in 1977 following the break-up of the East African Railways Corporation (EARC). TRL is 51% owned by RITES Ltd. of India whose concession was to operate for a period of 25 years from 2007. Two companies were formed through the concession agreement one being Tanzania Railway limited (TRL) where the Government of Tanzania held the remaining 49% share and the other being the Rail Asset Holding Company (RAHCO) which is 100% owned by the Government. While TRL was to be responsible for managing the day-to-day activities of the rail transport business and development of superstructure, RAHCO on the other hand was to be responsible for overseeing and monitoring the Concession Agreement to ensure compliance and monitor the performance of TRL while at the same time supervising implementation of future investments in the railway infrastructure.

Within just three years of the agreement being signed, the concession has failed and the Government of Tanzania recently announced termination of the agreement. The reasons for failure are many and varied but suffice it to say here that a combination of bad management, inadequate capitalization, natural disasters and the failure of both parties to meet agreed performance standards has left the railway in a worse state today than when the concession commenced. The challenge now is to restore operations and begin the process of redeveloping the system to a point where it can begin to meet the requirements of future users who will depend on the line for the realization of some of the identified mineral and other development potentials. Winning traffic back from road to rail is going to be a serious challenge on the Central Corridor given the poor performance of the latter in recent years.

One of the effects of problems with the TRL railway and because of periods of serious port congestion and inefficiencies at Dar es Salaam has been the loss of a great deal of business to the Northern Corridor. Although the route from the Great Lakes countries through Uganda and Kenya to the Port of Mombasa is considerably longer, more reliable and efficient port and surface transport (road) operations mean that this is often a more attractive option than using the Central Corridor. Conversely, disruptions on the Northern Corridor due to the political instability in Kenya following Presidential elections in December 2007 showed how vulnerable the hinterland States are to interruptions in transport and logistics systems.

All of this points to the fact that in their regional context, the Central and Northern Corridors are competitors for the business of the Great Lakes countries. While they do serve an overlapping hinterland, the future competitiveness and development of the region depends on the co-existence of both corridors as reliable and efficient transport infrastructure and logistics systems. Not only is there a need for more

integrated planning on both corridors from an infrastructure perspective, but from a regional economic development perspective there is a need to better understand the drivers of private sector investment in the portfolio of economic development opportunities in the combined corridor catchment area. This is particularly important for any consideration of the prospects for linkage development given the unequalness of levels of development of the manufacturing sector in the various corridor countries.

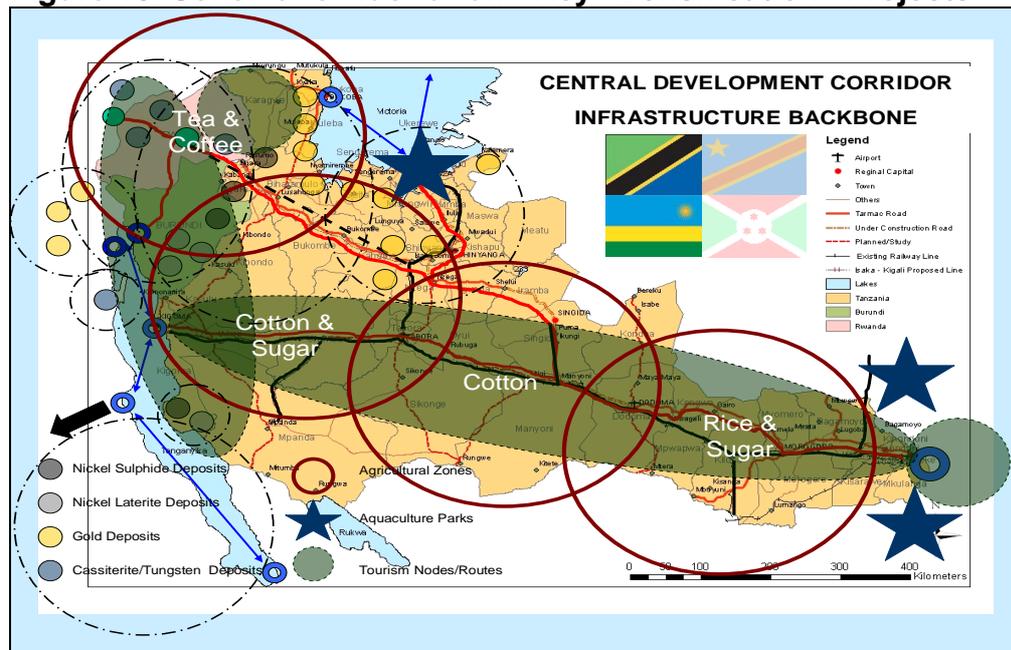
2.4 Widening benefits in a potentially functional corridor

This infrastructure is not only an imperative in narrow investment and economic terms. It is also important as the region continues to urbanise. Concentrations of more and more of the populations of the East African countries in towns and cities generates a market opportunity and can support economies of agglomeration but also require support in terms of infrastructure that functions to the benefit of connecting major nodes with one another and major nodes with their periphery. Such processes also hold important potential gains for enterprises of all shapes and sizes.

Beyond a consideration of mining “anchor” projects, their possible contribution to greater regional trade flows and the infrastructure development challenges that must be overcome for these to be realized, a great deal of work has been carried out on the CDC SDI on identifying and appraising the scope to “crowd-in” investment into “densification” projects in the agriculture, fisheries and aquaculture and tourism sectors. Enabled by transport and energy infrastructure investments, these investments are expected to support the growth and diversification of the productive sector.

Figure 10 below provides a simplified schematic representation of the location of the key “densification” projects that have been identified in studies commissioned through the CDC SDI process. The map superimposes on the main minerals clusters projects in agriculture, aquaculture, and tourism.

Figure 10. Schematic Illustration - Key “Densification” Projects



(Source: Adapted from CDC SDI reports (2006-09))

Agriculture has been, and remains, the backbone of economic development along the Central Corridor. It is the main source of income for over 80 percent of the population in both Rwanda and Tanzania and is the largest contributor to GDP in both countries. Thus, agriculture potentially provides a good basis for initiating downstream linkages to add value to agricultural produce. However, the sector suffers from a number of fundamental problems, which include low factor productivity (land, labour and capital), under-utilisation of the available resources (land, water and people) and low incomes and profitability for most producers engaged in the sector.

With a recent shift to market based approaches to agriculture, an imperative exists for investments to seek to increase competitiveness and profitability along the value chain from farmer to market, enhance sustainability of the environment and natural resource base and empower rural people to manage change by strengthening local institutions. Studies undertaken under the CDC SDI process to explore prospects for increased private investment in agriculture (Blueprint Development Consulting, 2007) paid particular attention to the need for policy to be responsive to the following: (i) the “business-friendliness” of existing policy frameworks and institutional arrangements; (ii) the suitability of the natural conditions for specific crops; (iii) the robustness of demand and price conditions in target markets; and, (iv) the degree to which regional impacts secure appropriately broad-based development benefits.

Based on a detailed analysis of nine priority sub-sectors the following five sub-sectors were recommended for further refinement in terms of pre-investment project packaging²⁴:

- **Coffee and Tea:** Focus should be on value added beneficiation, expansion of production and diversification of markets;

²⁴ See Blueprint Development Consultants, 2007 for more details)

- **Cotton:** Focus should be on expanding production, ginning, spinning, yarn and fabric production, garment manufacture and diversification of markets;
- **Sugar:** Focus should be on expanding production, developing sugar to ethanol for bio-fuels and power co-generation; and,
- **Rice:** Focus should be on expanding production, notably in areas related to sugar production, enhancing processing capacity and consolidating local and regional markets.

Within the fisheries sub-sector, aquaculture provides the greatest opportunity around which to attract private sector investment. In the marine environment, potential culture species include milkfish, mud crabs, seaweed, high value finfish, sea cucumber and prawns. Of these, high value finfish, sea cucumber and prawn farming are viewed as large scale industrial opportunities. In the freshwater arena, the major new investment opportunities, over and above the existing Nile Perch fishery, are for Nile tilapia and African sharp tooth catfish culture.

The potential to develop aquaculture parks as a means to creating an enabling environment conducive to establishing viable aquaculture businesses has been assessed. Designed to reduce the opportunity costs of setting up new ventures and establishing a public-private partnership to develop sites at which regulatory and land-use issues have been taken care of and the core infrastructure required to develop culture systems has been put in place, aquaculture parks offer a vehicle through which to kick-start commercial aquaculture development. Three potential sites for aquaculture parks have been identified: Mwanza; the Lower Rufiji basin and Bagamoyo north of Dar es Salaam.

In tourism, studies intended to identify new investment opportunities²⁵ reveal that there are five nodes/routes for further development and refinement of tourism related investment opportunities. Included in these are the proposed DRC/Uganda/Rwanda/Tanzania Primate Route. This route comprises of linking the following nodes: the Virunga National Park (DRC) the Ruwenzori Mountains National Park (Uganda), The Volcanoes National Park in northern Rwanda, all famous for Gorillas, which could be linked south to the Gombe Stream and Mahale Mountains National Parks, on the eastern shores of Lake Tanganyika that are world renowned for their Chimpanzee populations. This route could be extended to encompass the Kigosi and Moyovozi Game Reserves in north-western Tanzania, and to the Nyungwe National Park in southern Rwanda, which are natural habitats for a range of other Primates. Another of the routes proposed is the Trans East African Railway Route which focuses on the development of the Central Railway Line as a tourism route in its own right, similar to other rail-based attractions elsewhere in the region.

The development of these nodes/routes supports the main thrust of both the Tanzanian and Rwandan governments to promote the low-volume, high-value tourism model. It would also reflect both countries' strategy to diversify their tourism portfolio of products along the corridor, given the rich textured history of the slave trade and explorers expeditions. The promotion of coastal tourism to boost numbers

²⁵ De Beer et al, 2007

and the development of the central railway line as a tourism product in its own right are key elements of this strategy.

While the potential for non-mining development on the Central Development Corridor is clearly substantial, the CDC SDI methodology suggests that these densification initiatives will reinforce the Corridor business case but they are not seen by themselves as being able to drive the business case. Core to the approach of the Development Corridor model in the region is the notion that large-scale commodity driven private investments enable matching commitments to infrastructure which in turn can yield wider societal benefits. In the case of the Central Development Corridor, it is even arguable that these wider societal benefits could include the restoration and maintenance of peace and political stability in Burundi and the eastern-DRC through the successful implementation of natural resource investment led sustainable economic development strategies.

3 Literature Review

This section seeks to provide a limited review of literature related to the relationship between infrastructure and economic growth. Within this there will be some examination of infrastructure issues and enterprise development more specifically. The literature explored will also include that related to corridors and try to understand where they might fit into some of these debates. It should be noted upfront that much of the literature on corridors comes from the field of town and regional planning and spatial planning and as such there is not necessarily a foundation in the economic literature to explore this issue although economic geography and economic history have, drawing on related concepts touched on some important issues with regard to corridors and factors influencing their formation and their performance.

3.1 Infrastructure and economic growth

Literature on economic development has generated a diversity of perspectives on the impact of infrastructure on economic growth. Economic historians have pointed out that infrastructure development – what Rostow referred to a “social overhead capital” – has played an important role in the development of economies such as that in North America (Rostow, 1961; North, 1961). More recent studies²⁶, with a focus on the developing world, including the influential World Development Report of 1994 (World Bank, 1994) have reached some similar conclusions about the centrality of infrastructure delivery and quality to the development process. Escribano et al (2010) point out that, “Infrastructure quality has a pervasive influence on all areas of

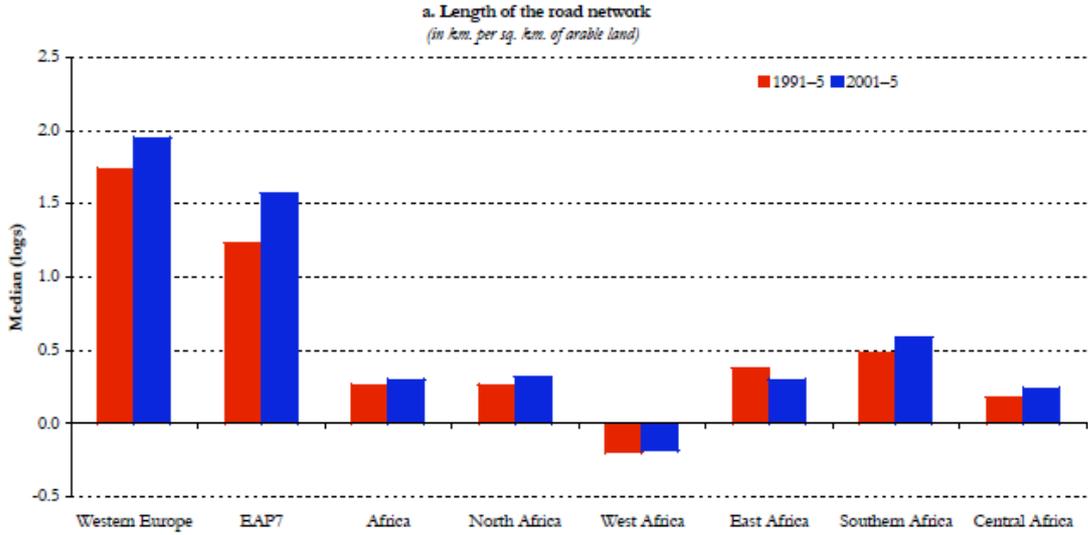
²⁶ “A large number of empirical studies illustrate the impact of infrastructure on economic performance, including those of Calderón et al. (2003a and b), Calderón and Servén (2003), Canning (1998), Reinikka and Svensson (1999), Prud’homme (2004), Escribano and Guasch (2005), Escribano et al. (2005), and Guasch (2004). All suggest that Africa’s infrastructure gap is an important growth bottleneck with a negative impact on productivity and the overall competitiveness of the region. Furthermore, several studies using the methodology of Escribano and Guasch (2005, 2008) and Escribano et al. (2008a and b and 2009) have found empirical evidence—in cases such as Brazil, Chile, Costa Rica, Mexico, Turkey, and several southeast Asian countries—that improvements in investment climate (IC) conditions in general, and in infrastructure quality in particular, may lead to important gains in productivity and in other economic performance measures: employment, real wages, exporting activities, and foreign direct investment (FDI) inflows.” (Escribano et al, 2010:2).

an economy. Low-quality infrastructure and limited transport and trade services increase logistical and transaction costs, rendering otherwise competitive products uncompetitive, as well as limiting rural production and people's access to markets—with adverse effects on economic activity and poverty reduction.” (Escribano et al, 2010: 2) The World Bank, a major funder of infrastructure projects for much of the latter part of the last century, has made the case that appropriate investments contribute to economic growth through enhancements in productivity (Calderon, 2008; World Bank, 2004). Calderon goes on to point out that authors examining the African context have drawn on extensive empirical work to demonstrate that inadequate or dysfunctional infrastructure has substantially hindered the growth performance of many countries noting that since around the early 1970s there was a sharp decline in infrastructure investments influenced by Structural Adjustment Programmes and the like which expected re-investment to be secured through private sources. The author goes on to note that specific research has demonstrated that a countries investing in infrastructure have seen greater improvements in their trade performance and that access to infrastructure is also associated with reductions in income poverty. As with much of the literature in the field Calderon emphasizes the twin imperatives identified in the literature: namely the quality as well as the quantity of infrastructure – noting that in some cases attention to matters of quality in infrastructure are likely to yield significant gains without the necessity of very large capital investments.

The work of Calderon, drawing on multi-country time series data, suggests that all regions in Africa have a lower infrastructure stock that Europe and North America (and also for Asia, bar some exceptions from North Africa). Similar trends are seen in the data presented on infrastructure quality. Of critical interest is that in almost all regions in Africa there has been an observable decline in the quality measures over the period 1990 to 2005 and in some cases a decline in infrastructure stock over the same period relative to the stock in the international comparator region areas (Calderon, 2008: 7). As others have also pointed out the most significant change in the period for the three infrastructure fields that are investigated (Roads, Energy and Telecommunications) has been the advent of cellular telephone networks which has seen an absolute improvement in the stock and in many cases quality of telecommunications infrastructure. Using econometric techniques the author argues that infrastructure stock growth and quality is not just coincidental to growth but also demonstrates causality (Calderon, 2008: 19). Interestingly in scenarios developed in the Calderon study the countries with a combination of a low stock and low quality of infrastructure illustrate the strongest growth responses from changes in investment and quality of the stock. For the purposes of this study it is notable that the East African region is one of the weakest performers.

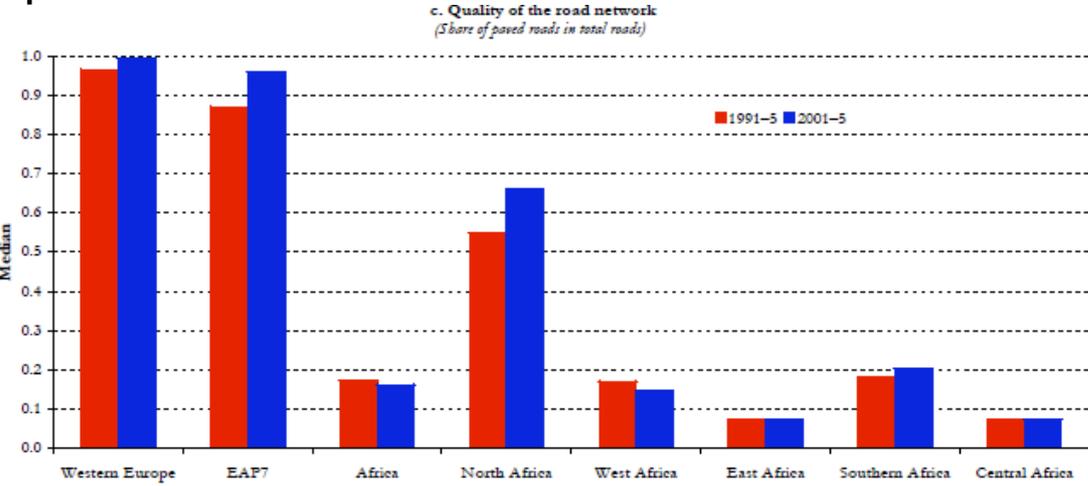
The following figures are presented to illustrate the issues raised by Calderon (2008, 2009).

Figure 11. Comparative road network results: Length of road networks in km per sq km of arable land



(Source: Calderon, 2009:30)

Figure 12. Comparative road network results: Quality of road networks – share of paved roads in total road network



(Source: Calderon, 2009:30)

Escribano et al (2010), citing Brunel (2004) note that under these conditions, “the colonial period has had a lasting effect on the use of space in the region, resulting in a productive structure that consists, in most cases, of coastal cities connected inland by railways designed to carry raw materials to main ports. This and other factors that are progressively modifying the continent’s productive structure - such as continuous urbanization, the movement of economic activity from the agricultural to manufacturing and service sectors, and the increasing openness of African economies - has caused both a quantitative and qualitative mismatch between the current supply of infrastructure and ever-increasing demand.” (Escribano et al, 2010: 2) For much of the continent today there remains a heavy reliance on systems and stock of infrastructure that has seen only marginal changes since the colonial era. Contemporary demands in a highly integrated global economy leave many of these countries at a severe disadvantage.

3.2 Firm performance and infrastructure

Drawing further from the African Infrastructure Country Diagnostic Studies there is also relevant material on the issue of firm performance and infrastructure. Escribano et al (2010) review, and argue in support of, literature reporting on studies showing the impact of infrastructure capital on Total Factor Productivity measures for large multi-country studies (Escribano et al, 2010: 12). The assigning of causality in such studies is a major challenge with one of the problems centering around whether firms that improve productivity for other reasons might be in a stronger position to in turn push for improvements in infrastructure and related services. There are however some common sense connections. For instance, in many African countries the use of fuel generators for power or back-up power is widespread. Businesses can often secure both cost savings and productivity gains should they be able to link up to large scale power grids that are well managed. Similar claims can be made for transport infrastructure and in this regard the authors cite the work of Limão and Venables (2001, as cited in Escribano et al, 2010: 14) who demonstrate the quantitative significance infrastructure on transport costs which in turn have an important role in determining the transport costs in both landlocked and coastal countries.

In Escribano et al's manufacturing firm specific data analysis, drawing on the World Bank's Investment Climate Assessments, it is noted that within the countries included in the study, "The lowest-ranked countries are those with the most antiproduktive IC [Investment Climate], in other words, those whose IC conditions pose difficulties to economic development. These countries are Tanzania, Malawi, Uganda, Benin, Mauritania, and Zambia." (Escribano et al, 2010: 32)

The additional detail provided in the figure which follows (Table 5) gives an indication as to the direct impact on firm costs that sub-optimal management and delivery of infrastructure and related services might have on firms. It is notable in this data that Sub-Saharan Africa lags all other regions and therefore places a major competitive drag on them.

Table 5. Export and import procedures (time and cost) for different regions

	Number of documents needed for export	Time for export (days)	Cost to export (\$ per container)	Documents for import (number)	Time for import (days)	Cost to import (\$ per container)
Organization for Economic Cooperation and Development	4.5	10.7	1 069.1	5.1	11.4	1 132.7
East Asia and Pacific	6.7	23.3	902.3	7.1	24.5	948.5
Latin America and Caribbean	6.9	19.7	1 229.8	7.4	22.3	1 384.3
Eastern Europe and Central Asia	7.1	29.7	1 649.1	8.3	31.7	1 822.2
Middle East and North Africa	6.5	23.3	1 024.4	7.6	26.7	1 204.8
Sub-Saharan Africa	7.8	34.7	1 878.8	8.8	41.1	2 278.7

Source: World Bank, 2009.

Note: This information measures procedural requirements for exporting and importing standardized cargo of goods by ocean transport, from the contractual agreement between the two parties to the delivery of goods, along with the time and cost necessary for completion. All documents required for clearance of the goods across the border are also recorded. For exporting goods, procedures range from packing the goods at the factory to their departure from the port of exit. For importing goods, procedures range from the vessel's arrival at the port of entry to the cargo's delivery at the factory warehouse. For more details, consult: <http://www.doingbusiness.org/MethodologySurveys/TradingAcrossBorders.aspx>.

(Source: UNCTAD, 2009: 38)

These factors present real challenges to the prospects of developing countries such as Tanzania. Studies such as those under the AICD banner demonstrate that that real growth, poverty reduction and productivity gains can be yielded with appropriate investments and improvements in infrastructure. However, the very weak financial position of countries such as Tanzania and the global declines in ODA-type contributions as well as limitations on the affordability of loan finance all present obstacles to governments responding. These are often aggravated by policy environments that are not conducive to action around the management and efficiency of infrastructure investments resulting in gains from investment being somewhat subdued. For example countries might seek to limited cell phone providers to be in a position to impose greater tax burdens on oligopolies. As a result consumers pay more and might get a poorer quality service if there is inadequate competition or if players are not adequately regulated (a notoriously difficult process) in a context of weak institutions. Estimate from the Africa Infrastructure Country Diagnostic (AICD) project suggest that well over 20% of GDP would need to be invested in infrastructure for a country like Tanzania to overcome its infrastructure backlogs over the next decade or so (Foster, 2008). In a context where there are major social demands this presents major pressures. Competing demands from different sectors for infrastructure also present challenges where a government might seek to placate different interests by responding sub-optimally to all of them.

3.3 Corridors and development

The notion of corridors is discussed in the literature as the brief for this report required a specific examination of the potential of this concept to contribute to growth

and poverty reduction efforts in the context of the minerals development boom. As is noted in the material that follows the concept is often used merely to describe the existence of an infrastructure connection between two nodes. However, for the purposes of this report it is examined in its contemporary developmental usage where it involved not only the presence of infrastructure but also the active facilitation of efficiency, investment and productivity enhancing processes associated with the flows of goods and services along the corridor and between the corridor and other nodes of significance (such as export markets).

The term corridor, used to describe forms of infrastructure linking at least two different areas, started to be used with some frequency in academic literature on urban and regional development in the 1960s (Whebell, 1969; Priemus & Zonneveld, 2003). Most frequently its focus has been in transport connectivity but in more recent times the notion of the corridor has been expanded to “bundles of infrastructure” now also including, “things like ICT infrastructure, power lines and cables as well as pipes for drinking water, natural gas, crude oil, electricity and sewage.” (Priemus & Zonneveld, 2003: 67) It is also noted that the concept behind the term corridor predated the actual use of the term in that projects to support greater flows of goods or people between different areas, or projects to enable the exercising of political and military power also generated many corridor-like ventures in the past few centuries. Whether they were trading routes such as the Silk Road, Roman engineered roads or notions of trans-continental rail-links such as the Cape-to-Cairo link proposed by Cecil-John Rhodes, all were motivated to one degree or another by some similar elements that are found in contemporary discussions of corridors. Worth noting here is the fact that in creating links between areas corridors have always involved a governance dimension in that they have cut across political, administrative and other boundaries and necessitated some measure of coordination. This dimension is only too obvious in the painstaking diplomatic processes that have had to underpin progress in contemporary corridor initiatives such as the Maputo Development Corridor.

There is also some benefit in noting Whebell’s assertion that corridors, especially those concerning transport infrastructure such as road and rail often have path dependent consequences in that historically their emergence would have influenced patterns of economic geography and that the sunk-investment would have often enabled future investment on a more manageable scale along similar patterns. Although in some cases technological advancements might render such path-dependant issues obsolete such as for instance with some types of telecommunications infrastructure, it is still common for things like cell-phone communication towers to follow major existing transport routes as any study of mobile-telephony connectivity maps in Africa would show. Furthermore, economies of scale in existing centres and along corridors often supports new bouts of path dependency such as those clustering business process outsourcing enterprises in close proximity to major fibre-optic cable points. This notion of impact-feedback loops in corridors is also noted elsewhere whereby, “The assumption is that traffic and infrastructure are not only derived from social and economic processes but to a high degree determine these functions as well. Following this logic, corridors have a considerable impact on spatial developments and spatial patterns.” (Priemus & Zonneveld, 2003: 173) A related point is made by Whebell in pointing out that, “The development of a corridor, although a response to the above factors of culture

gradient, least effort, and the inertia of pre-existing urban pattern, may itself, lead to the establishment of secondary urban centers. This has been especially true as respects railways, which required frequent servicing in their early years of operation.” (Whebell, 1969: 4)

Although the process of exploitation of minerals and other commodities has heavily influenced the historic development of patterns of infrastructure (North, 1961) it has been the subsequent developments along such routes and/or at both poles that has often seen such connections subsequently being described as corridors. Whebell notes that, “Major areas of special resources exploitation, especially large coalfields, may generate corridors, but, since such developments are characteristic of the later nineteenth century in the New World, they have occurred subsequent to settlement of the land and the development of the early all-purpose corridors. Moreover, being largely single-commodity lines, mineral-based corridors appear not to have great growth propensity.” Certainly in taking a historical view of Africa it can be suggested that Whebell’s pessimistic view of commodity-based corridors is quite well supported by the available evidence. Although, as is suggested later in this report, this might nonetheless provide some measure of a foundation on which a more prosperous corridor might be further developed.

The growing economic importance of urban areas combined with processes to enhance economic integration in the 1980s and 1990s spurred a renewed interest, initially in the developed world, and subsequently further afield, in grander corridor initiatives across national borders. The formation of the European Union gave substance to such processes in Europe and supported such endeavours with centralized pools of funds. In order to secure some gains from globalisation and integrated markets it was necessary that mobility of goods, services and people was enabled and that investing along corridors would help generate thresholds that would enable financing and also help reduce shares of transport costs thereby enhancing competitiveness. The potential contribution of corridors to enhancing processes of agglomeration and the related economic benefits from this have, more recently, been extensively argued in the World Bank’s World Development Report 2009: Reshaping Economic Geography (World Bank, 2009).

These endeavours were also substantively echoed in the New Partnership for African Development (NEPAD) promoted by former South African President, Thabo Mbeki and launched in 2001.²⁷ The NEPAD agenda, alongside important political and economic reforms, promoted the idea that African governments needed to collaborate to enhance regional economic integration and participation in the global economy through a renewal and enhancement of infrastructure platforms. Amongst NEPAD’s most prominent programmes were a series of corridor initiatives identified across the continent. Despite some criticism that these initiatives have not been able to progress much or that they were driven by South Africa’s growing economic interests in the region, the corridor development agenda remains a prominent one, particularly in Sub-Saharan Africa.

The World Bank report (World Bank, 2009) provides some useful insights into the contemporary case made for conceiving of corridors as being important to economic

²⁷ NEPAD activities as of 2010 are being hosted in the newly established structures of the African Union.

prospects of different regions. Two core elements dominate in this framework: firstly that urbanisation brings with it the potential for regions/nations to harness economic gains through agglomeration benefits associated with this urbanisation; and secondly that countries that are best able to enhance flows of goods and people between such centres – nationally and internationally – will reinforce both urbanisation and agglomeration benefits through lowering barriers to trade in both administrative and transport-cost dimensions. Of particular interest in the African context is the case made in the report that these factors can combine to further reduce inequality, including spatial inequality – not through state intervention but through medium-to-long-term societal gains from more competitive economic processes.

It is generally argued in the literature that places that might not be the book-ends of a corridor but that nonetheless can connect with the corridor either through its poles or along a route of movement and exchange are likely to enhance their prospects. Firms and households can secure benefit from this connectivity in that they are able to take advantage of scale economies of exchange between the poles and the related investment in infrastructure and services that might not otherwise have been invested without the movement and exchange imperatives between the poles existing. However, there is also a perspective, supported by some evidence, that locations and areas along such corridors can also suffer through loss of amenity necessitated by the demands of exchange between dominant poles and through greater exposure to dominant firms in the poles who might be enabled by corridor infrastructure to service wider markets than would have previously been the case. These are most common on the extreme urban periphery although there is also some counter-evidence showing that urbanisation can begin to interrupt declining marginal costs through factors such as congestion and thereby drive firms and households to more peripheral nodes. Thus, it is not uncommon in the literature to find assertions that, “areas through which large volumes of passenger and freight transport pass are attractive for the location of companies, especially those operating in the realm of distribution and logistics. Eventually this would lead to urbanisation in places located between present urban centres, starting with some sort of ribbon development, and then giving way to new urban growth poles.” (Priemus & Zonneveld, 2003: 173)

In looking at the SSA context a number of strands of this discussion appear to pose some conceptual challenges. Clearly functional, infrastructurally sound corridors do form part of the settlement and economic activity landscapes of the continent. At the urban scale many major settlements were designed in ways that drew on concepts of engineering service corridors and in subsequent years those living in the cities have matched uses along transport routes that optimize their economic prospects. Beyond the urban scale, corridors are also a feature where both historic and contemporary exchanges between nodes (even across national borders) have relied on available infrastructure to set in place patterns and limits to economic processes. However, where in many developed country contexts such corridors have periodically had their functionality upgraded through capital investment and new systems of management, bar a few exceptions, such corridors in SSA have either seen their functionality barely stabilised or in fact decline in some terms as economic cycles and crises, political instability and weakening private sector capacity have undermined thresholds of activity and investment processes. Furthermore, unlike much of the developed world where urbanisation reached its peak rates many decades ago

alongside processes of industrialization, much of the continent is only now entering an era where urban-centres are growing in economic importance. Infrastructure developed during the colonial or early-post colonial era was primarily geared to enable the extraction of raw materials from hinterland areas to export ports. When the 1970s commodity cycle drove prices down and demand for these materials declined corridors linking such sites of extraction and major urban centres had little justification to garner precious capital investment, let alone maintenance spend.

As a result, many of the regional corridors in the SSA region are characterised by low levels of functionality, even with the renewed commodity investment of the early-to-mid 2000s. Few of the corridors have, as part of their original design, connectivity between major urban centres leaving even bigger challenges to secure the necessary resources to make explicit such connections that have been consistently invested behind in regions such as Europe. The low levels of functionality described here, alongside some disruptive economic policies, have further disabled the potential gains to firms and households along the length of these weakened infrastructure backbones. This has further been aggravated by a tendency for public investment to match the needs of political expediency rather than any quasi-rational spatial economic strategy such as that advocated by many policy makers today. Levels of dysfunctionality have been further aided by forms and systems of bureaucratic regulation that add substantially to transaction costs in economic processes, further undermining scope for actors to try and yield economic gains from corridor-type contexts. Of course in an infrastructure denuded context making a case for further investment in corridors with historic investment above the national norm – even if substantially decayed – was always a major political challenge.

In Africa, if the original point of corridors was more often than not a port or an administrative capital and the termination point more often than not a mine or a plantation rather than a complex urban settlement with diverse economic activities sustaining such corridors was always going to be a challenge. Levels of interdependency between economic actors, beyond the most crude, were not enough to sustain growing levels of more complex exchanges. The question then asked is does this new round of commodity investment, often needing further stretching of these truncated colonial-era corridors justify the investment. The answer, in all but a few cases seems to be no without both seeking to cluster together connectivity with a group of major commodity extraction projects and without breaking the path dependent patterns of corridors to redesign them to take in a network of hinterland urban centres that help build thresholds and also contribute to notions of economic integration introduced earlier. Forging of such processes is likely to be extremely complex with competing interests between stakeholders needing different types of functionality such as that between rail and road. However, it is the only way in which incrementally or in greater surges functionality on corridors can be enhanced.

Corridors thrive off a measure of balancing of demand and tend to decline under conditions of extreme asymmetry. Massive mining projects can contribute to a temporary balancing of sorts but alone do not necessary generate types of demand that could create a sustainable platform for a wider sharing of benefits along the length of corridors and beyond their poles. Corridors need to serve as the arteries of processes of urban agglomeration and can be given temporary oxygen boosts by demands of the mining sector but unless this translates into more complex

development patterns of clusters of other mines and urban settlement their impacts might be shortlived. The prospects of a sustained commodity boom cycle seen to be a result of demands of the growing economies of India, China and Brazil create a real opportunity for the evolution of strategies to enhance corridor integrity but will require nimble and creative governance responses that have, to a large degree, eluded the region's leaders to date.

4 Methodology and Key Questions

The study was informed by two core questions. These were in turn used to guide the methodology. The two core questions were:

- What can infrastructure development contribute to the deepening of development impacts and in particular firm linkages related to commodity extraction projects?
- What can the concept and practice of organised corridors offer to enhancing linkage potential?

The study was further informed by a layer of hypotheses that were seen to be important to try and test, even if only using a largely qualitative method. Whilst these were not engaged with on a consistent basis they nevertheless provided important framing devices for the work that was conducted. The hypotheses were as follows:

- Minerals investment generates demand for, and (in some cases) delivery of, INFRASTRUCTURE
- Weaknesses in INFRASTRUCTURE systems constrain local business development including LINKAGES opportunities with minerals investors and scope for linkage into other mineral exploitation hubs
- The absence of a coordinated infrastructure delivery, management and governance response (i.e. POLICY and IMPLEMENTATION related to The Corridor) for minerals investment (a) reduces the demand for local suppliers (LINKAGES) which in turn constrains the development opportunities available to local suppliers; (b) reduces the potential to generate LINKAGES from the infrastructure investment itself; and (c) reduces scope to leverage connections with potential REGIONAL INVESTMENT AND SUPPLY HUB

4.1 Approach to collecting study data for the Tanzania case

The study has sought to combine qualitative and quantitative methods, however, the focus was largely on qualitative methods. The study involved the use of semi-structured interviews combined with an extensive secondary source analysis including official documents, commissioned reports, press and academic studies. Interviews were conducted with selected key informants from key economy sectors of relevance to the study both within government and outside government including government officials, multi-lateral institution officials, academics, private companies and organisations of business. The strategic selection of interview candidates has

involved a measure of snowball selection where individuals or organisations are referenced by initially selected informants.

- Respondents were secured from the following:
- Mining companies/large mine contractors (4)
- Government Departments (6)
- Donor and multi-lateral officials (3)
- Specialist consultants (2)
- Industry/sector bodies (3)
- Infrastructure agencies (2)
- Transport providers (2)

The interactions with informants were based on a semi-structured questionnaire which was used to define key areas for discussion with respondents around common issues despite the diversity of institutions from which they came.

The study was also able to benefit from group and one-to-one interaction with participants in the various MMCP workshops including those from the mining industry and mining industry supply sectors.

Methodological shortcomings included lack of quantitative data and biases in informant selection. Both researchers were dependent on advice from the initial panel of respondents and did not have the resources to secure a broader set of responses from Tanzanian enterprises and their entrepreneurs. Surveying these enterprises could have given a deeper insight into factors that they felt would have specifically constrained their ability to service the market needs of mining companies. The study also sought to draw on other MMCP investigations in Tanzania to compensate for this shortcoming. Furthermore, the results of the study are somewhat influenced by the experience of the gold sector as it has an actual operating presence on the ground at some scale. Whilst for some of the other mining sectors respondents, they were needing to project ideas from their exploration experiences and from their own interactions with various stakeholders rather than actual mine operation experience in Tanzania.

4.1.1 The Mozambique leg of the project

Due to the fact that the Mozambique work was introduced into the project at a late point in the study the methodology for this was based largely on what was feasible within the time frame. This consisted mainly of drawing on the experience of the two authors in working in the area and some limited direct interaction with government officials and staff of the mining companies. This interaction was often opportunistic and was based largely on unstructured interactions but informed by the core research issues already identified.

5 Infrastructure constraints on linkage activity in the Central Corridor in Tanzania

All respondents were approached with the intention of obtaining insights from them as to factors that they felt enabled or constrained linkages in the mining sector.

Specific follow up questions were asked with the intention of establishing the details around the impacts of infrastructure on both the linkage choices of mining companies (and their primary contractors) as well as on potential or actual domestic suppliers. Respondents were also asked to reflect on the value that they felt a corridor type process might add (using the example of the Maputo Corridor) to enhancing linkages – directly or indirectly. This material is discussed in the light of material presented in the background and literature sections where appropriate.

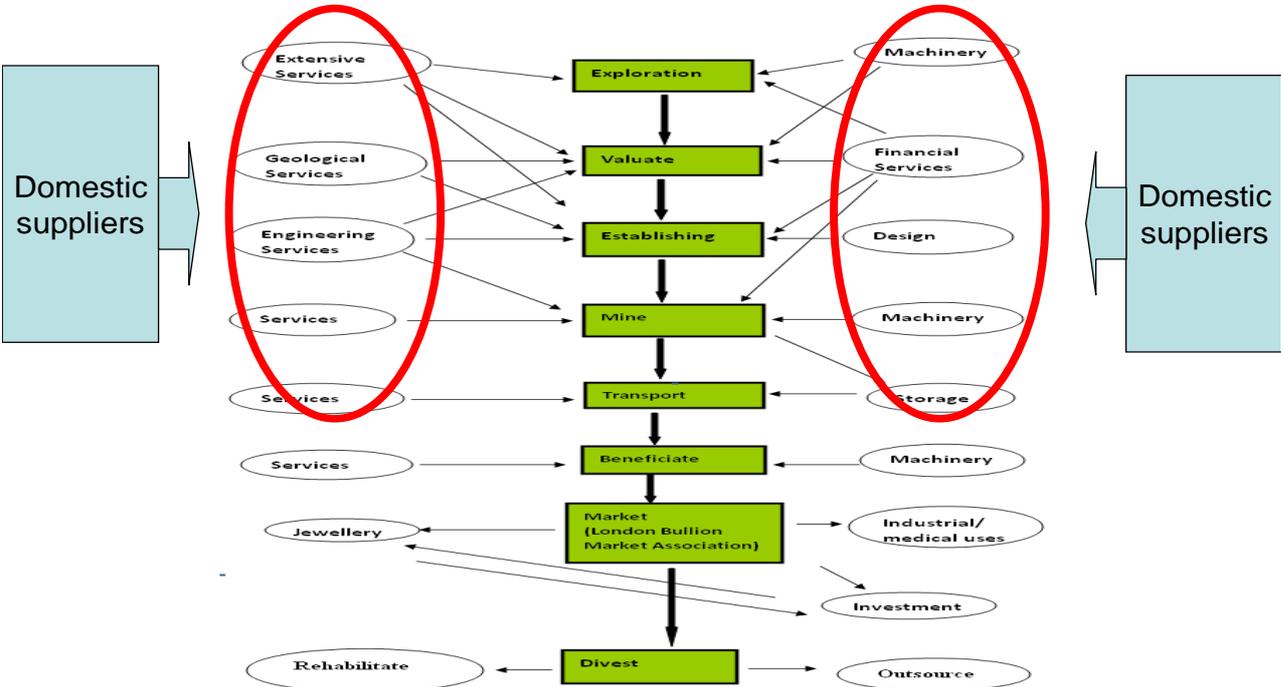
5.1 Overview of mine stages and mining value chains

In the discussion of mining and linkages it is important to keep in mind the stages of a mine and the mining value chain. The different stages bring with them very different input demands. It is also important to note here that different role players have different levels of influence over procurement choices at different stages. For instance survey and exploration might be done by a different company to that which actually then secures the rights to mine. Furthermore, it is common for the establishment phase of a mine to be outsourced to a specialist contractor company after which the mine is then handed over once operations are ready to proceed. However, the mine owner will exert influence all the way through. The following stages are commonly seen in the development of a mine:

- Survey and exploration activities
 - Geotech survey, camp establishment, logistics, sourcing and operation of capital equipment.
- Mine establishment
 - Engineering and construction work to ready mine for operations including excavation, establishment of shafts, construction of main facilities, sourcing and installation of capital equipment, commissioning of infrastructure, construction of on-site processing facilities, hiring and training of labour, negotiation of agreements with government and development of mine accommodation (often through lead MNC contractor).
- Mine operations
 - Supply of labour and skills, supply of mine consumables, general transport, management of inventory, logistics operations for export, running of material processing facility, supply of utilities, environmental management and mitigation, maintenance of facilities and equipment, training, financial and administrative management, management of contracts for commonly out-sourced operations (catering, equipment maintenance, security, laundry, fuels supply etc), CSI activities.
- Mine re-fit/shut-down maintenance
 - Varies in scope and scale but often include new engineering works (opening new phase of mine), refurbishment of facilities, installation of new or upgrading of infrastructure.
- Mine area rehabilitation
 - Civil works, re-establishing vegetation, site management etc.

In terms of the value chain it is important to note that this would differ from case to case with different minerals being mined. However, there are some generic steps that are commonly associated with mining. The figure below provides a simplified generic mining value chain. In looking at linkages in the mining sector it is important to consider both the vertical and horizontal dimensions. In terms of the vertical dimensions countries can consider trying to secure more of the downstream (or upstream) processes (often referred to as moving up the value chain). However, as the figure below (Figure 13) suggests in countries such as Tanzania the prospects of moving up the value chain often remain highly challenging often requiring substantial capital investments, operations of considerable scale supported by both hard and soft infrastructure forms. It is for this reason that the horizontal dimensions of linkages into the value chain becomes critical for many developing countries. This would entail the building of supply links at a domestic level for the parts of the value chain that are present in the country. It is these horizontal linkages that emerge as being significant in the research presented below.

Figure 13. Horizontal and vertical dimensions of the mining value chain



(Source: Mbendi. World Mining-Exploration Value Chain originally cited by Mjimba 2010 with additions by the authors)

5.2 Factors influencing mining companies’ linkage choices

This section seeks to provide some sense of what mining companies choose to contract to local companies and the factors influencing their choices to contract or not

to contract with local suppliers. Two gold companies were interviewed as was one large mine contractor. Discussions were also held with a company with interests in coal, iron ore and nickel. All have exposure to Tanzania either in existing projects or in advanced exploration.

In line with findings of others such as that of Mjimba (2011), the linkages with local contractors varied according to the stage of mine development. In the exploration phase there was limited use of domestic supplier firms although there were some linkages noted in terms of using local branches of affiliates of international specialist companies for various elements of specialized work (eg drilling, legal services etc). Exploration firms also drew on local transport providers, used domestic accommodation providers, and contracted some local firms for site exploration needs such as construction of basic facilities, although much of the expertise, equipment and consumables would be brought in from other countries for the activities.

In mine establishment the picture of domestic procurement did change in scale, although not much in scope. Particularly important in these processes would have been contractors use of local transport companies (what one respondent described as a “necessary evil” in that the providers were often not in possession of the best quality trucks). There was also a level of local linkages in terms of the construction although at best this was described as patchy and generally related to work on basic civil works or construction of structures for support activities at mines. Use of locally sourced material in this construction-related work was highly uneven and often limited to lower value items such as building sand but there was also use of local suppliers in the steel and metal fabrication sector as well as in supply of goods such as window frames and doors. None of the respondents indicated that they made specific local content and local contracting obligations on their core contractors in mine establishment. Also notable in this phase was the sourcing of the labour and skilled artisans needed for operations of the mine. Here the mining companies indicated that they liked to see the mine establishment phase as part of a process of skilling up local labour, artisans and specialists (such as safety officers, human resource administrators etc) for bringing on to their books once the mine entered its operational phase. This was supported in parallel by the setting up of a selection and training infrastructure to enable the mine to meet its operational needs in terms of staffing. One of the mining companies also noted that contractors during the establishment phase for things such as security, transport and the like could potentially prove themselves to enable them to be in the running for contracts later on. Firms that gained local site knowledge during this phase were at an advantage – especially since they often had to set up a local infrastructure from scratch in almost all cases since local towns or villages were unlikely to have firms with the necessary capabilities present. The mining contractor noted that consumables purchases were made at various times during this phase from local suppliers as the needs on site changed quite substantially from week to week and month to month – although reliability problems were a concern and it was not unusual to opt for air freighting consumables directly to the mine area from a place such as South Africa.

The operations phase generally began with only a limited set of local contracts in place. More often than not the core contracts would have been agreed with suppliers and contractors that the mine company had direct experience with either in terms of the hand-over phase from the establishment contractor and project managers or from

other mine sites in Africa and elsewhere. Some scope existed for early local sourcing but such decisions were often influenced by price factors and an unwillingness to use domestic supply intermediaries that tended to raise supply prices with no particular added service. Some core contractors such as those doing maintenance, catering, security and some mining consumables supplies did encourage some sourcing from Tanzanian suppliers but these tended to be limited term agreements to meet particular exigencies or as a test to establish the viability of different supply chains. All respondents noted that operations began to settle down and enter some level of predictability when many initial teething problems had been ironed out there was some corporate interest in growing local sourcing. One respondent suggested that this had to do with the need to respond to growing government or NGO pressures as operations intensified but also pointed to shareholder interest around corporate citizenship obligations.

The mining companies indicated that by-and-large their corporate social investment (CSI) focus was in the immediate vicinity of the mine and that there were attempts described by the two operating gold mining companies to support local enterprise through this channel – although not in most cases for direct supplies to the mine – rather to service the demand generated from mining employment in the area. However, there were also some CSI obligations met in other areas of the country where it was deemed appropriate in terms of corporate interest or local need or where some collaborative endeavour was considered through a structure such as the Chamber of Mines. Immediate vicinity impacts also included erratic incidental supply purchases. One respondent indicating how he had heard stories of a mine where officials ran out of toilet paper and had to use petty cash to buy all available toilet paper supplies from formal and informal shops in surrounding towns and villages.

Mine supply contracts tended, if they were in some way localised, to be with companies located in the major centres and to a large degree with those based in Dar es Salaam. More often than not these would be for one-off services and goods supplies such as a particular fence repair contract or the supply of galvanized steel or timber products. More consistent supply arrangements tended to be with local subsidiaries of global companies such as fuel suppliers, catering, medical care and the like. Despite the uneven and patchy experience in local linkages respondents argued that as a proportion of total contracted supplies over time these were growing (if only incrementally and not always with hundred percent owned and operated Tanzanian businesses). One respondent pointed out that Tanzania today was markedly different in terms of supply availability than it was a decade ago and it was likely that more and more local companies would get exposure to mine supply experience and capabilities over time. The respondent referred to the fact that published tenders in major newspapers for the mining sector are now common when they were very rare a decade ago. The presence of many global supply companies – such as heavy equipment providers – was an important part of the change that two of the respondents said would help build local capabilities.

Mine re-fits or major maintenance episodes also offered contract opportunities to local firms. There were often major time pressures on these projects that could at times advantage well placed local suppliers but could also work against them if the scale of work to be completed in a short period was beyond their in-house capacity. The limitations of bringing labour for these projects from outside the country worked

in favour of local suppliers who could mobilise their labour as part of sub-contracts with larger multi-national contractors. The requirement during these processes for customized solutions identified during the experience of actual operations (as opposed to those designed off site in planning stages according to mine blueprints) also lent itself to some local supplies for construction of facilities and supply of some steel and other products.

Although no respondent has particularly extensive experience of mine site rehabilitation in Tanzania there was some exposure to some mitigation works. These were often labour intensive and were at times off the mine site so had slightly different safety obligations (such as not having workers to be accredited and trained to be working within the confines of the actual mine) although they were associated with the mining companies and needed to be done at a high standard because of global scrutiny of the sector. Supply linkages of equipment (such as spades and wheel barrows) as well as plant material could be sourced from a combination of local suppliers in the immediate vicinity and from those further a field. The growing importance of these activities had now seen a number of multi-national mine engineering companies branch out into this territory which could limit scope for future local contracts.

It should be noted that the recently adopted Mining Act of 2010 has some sections that could contribute to a clearer approach from the Tanzanian government around linkages. In applications for prospecting licenses and mining licenses mining companies are expected to provide a list of goods and services available for them to procure in the domestic economy. This could enable better alignment of government support behind prospective local suppliers. The regulations also specify that the holder of a mining license, “implement plan (*sic*) for procurement of goods and services available in the United Republic.” (United Republic of Tanzania, 2010: 48)

5.3 Constraints to local linkages

A host of constraints to local linkages were raised in the discussions. Some effort was made to identify those that were more important to others from the perspective of mining companies however the same issues were not always raised as different mines had different experiences. Those constraints that were raised most often and were said by respondents to be the major factors limiting the scale and scope of supply contracts included:

- Lack of mine-supply specific experience and associated/recognised accreditation.
- Insufficient demonstrated in-house capacity to deliver at the right quality, at quantity, within budget and on time.
- Risk aversion behaviour and limited briefs of on-site or country-located purchasing staff.

The factors influencing these constraints were also explored as these were of particular interest for this report. In terms of the first point (experience and accreditation) respondents pointed out that even Africa mining supply was a

globalised business and lack of exposure to this was a major constraint. For example one company had an agreement to contract a particular partner on all its worldwide mines as part of a corporate deal. Parochial knowledge did have some value, but was often outweighed where companies could demonstrate capacity to respond in changeable conditions. As globalised entities themselves the mining companies needed contractors with accreditation that would stand up to scrutiny in the world's major financial market environments.

Factors influencing firm capabilities were seen to be varied. Included amongst those raised were a lack of domestic competition generating improved performance, the small scale of many enterprises, their lack of access to different forms of capital, firms not having a competitive advantage in terms of an existing national network, skills levels, management capacity and intellectual property issues. Infrastructure issues were raised, but often as a secondary element. For instance, the high costs of moving goods by road and the problems of possible damage to product meant very high upfront costs to suppliers and high insurance obligations which were not easily met within the firms budgetary capacity. Infrastructure was also seen as an excuse given by firms for failure to meet delivery obligations. For instance one respondent pointed out that a galvanizing firm delayed suppliers because of erratic electricity and also struggled to deliver at a competitive cost because of needing to carry the cost of a stand-by generator. When prompted respondents also pointed out that infrastructure in neighbouring towns and villages was a major issue that needed attention. Mining companies could not be seen to work with suppliers not operating from approved premises where contamination, safety and quality issues could not be guaranteed. In this regard the one mining company mentioned local sourcing of fresh produce was a challenge where the cold chain was not maintained and production conditions were not meeting a minimum standard. Respondents did not express much confidence in local business support measures from the Tanzanian government and generally agreed that they would need to evaluate firms themselves.

The respondents also indicated that there was not always a substantial corporate drive to develop local supplier capability as this was not seen as a core-business of a mining company. Purchasing managers were under pressure to meet mine operating obligations under very testing supply conditions (particularly those related to logistics such as delays in consignments at the port or roads becoming dysfunctional due to rains). Adding the development of local suppliers to this obligation was not that easy as it potentially raised risks and rarely brought cost advantages. Furthermore the authority of local supply staff tended to be quite limited. Their commitment to local supply was aggravated by a high turn-over of staff who did not get to know local supplier capabilities.

5.4 Linkages and infrastructure

The paragraphs above have already outlined that infrastructure issues – whilst often being a major consideration to the mining companies in terms of their operations – tended to be reflected as an obvious constraint to their supply choices. However, infrastructure issues were seen as undermining the potential of local firm capabilities where larger trans-national suppliers tended to have the wherewithal to manage the impacts of these challenges. On the issue of the corridor concept there was not a strong set of responses from the mining company stakeholders with the exception of

the company interested in exploiting bulk-export commodities requiring substantial rail and road infrastructure not just in Tanzania but also at a regional level. All respondents were aware of the corridor discourse in Tanzania and agreed, citing the Maputo experience, to the importance of the approach. However, none felt that there was much in the way of evidence of a coordinated infrastructure delivery strategy being implemented and noted that tendency for many of the plans to remain paper-bound. Dialogue had taken place, often through consultant interactions or via the Chamber of Mines, but there was little to suggest that the few activities that had taken place such as upgrades in the port and some road network improvements were being matched by coordinated efforts to integrate planning, management and delivery. For example, one respondent suggested that customs clearance obligations were largely unchanged there was some new crane capacity in the port. For the company exploring the bulk mineral exporting option something like the corridor process was necessary to ensure viability whilst, for the other mining companies they had planned their investments assuming, to a large degree that infrastructure would always be a challenge and so were not dependent on the corridor process becoming a reality. However, it was pointed out that cost pressures on the mines would grow as they matured and prices would fluctuate and under such circumstances being able to connect at lower average prices to the electricity grid or having much improved road connections would become more and more important in extending the life of the mining operations. One respondent mentioned that within this process the need for the Tanzanian Government to take responsibility for urban centres emerging around or growing near mines was critical as mining companies could not sustain the “running of a colonial-type mining village” (respondent interview).

5.4.1 Tanzanian firms and perspectives of linkages and infrastructure

A limited set of respondents were interacted with for this section. These included the Chamber of Commerce and a few entities working in support of domestic enterprises. The authors also had the benefit of interacting with Chris Hanlin in his capacity as an advisor to the MMCP project and his extensive experience as a local contractor. The respondents from the representative business organisations indicated a high degree of frustration at what they felt was the limited benefit to Tanzania from the mining investment. Respondents felt that not only were Tanzanians being excluded from preferential access to shareholding but the taxation and royalty agreements were also seen to bring only limited benefit to the country. Although respondents admitted that the sector had had an impact on the country in terms of FDI and the entrance of new economic players there remained disquiet about the lack of domestic influence and benefit. It was argued that many contracts that were deemed local were in fact with local structures of foreign companies and that the bulk of the small and medium business sector in the country was being excluded. Key reasons for this included:

- A lack of commitment from the mining companies to seriously grow local procurement with a tendency by them to use large international contractors;
- A lack of support to enterprises to help them meet complex criteria (including standards accreditation and funding);
- Use of intellectual property rights barriers to avoid using local suppliers.

Those entities involved in delivery support programmes to the SME sector echoed similar concerns but also pointed out that there were insufficient resources to support enterprise development in the country. Further it was argued that the business climate was far from what it should be. Issues raised under the business climate included bureaucratic obligations, corruption, high cost and low quality of services, inadequate infrastructure and high cost/inaccessibility of finance.

Drawing from respondents with more direct exposure to the mining sector, and inputs from Chris Hanlin, the issue of being given an opportunity to prove capacity was also a concern. Mining companies were reluctant to test out new suppliers, although this was dependent in part on the character of mine management. Furthermore, the complex tender requirements, very inflexible standards and approach to use of materials as well as slow payment times also negatively affected local suppliers. A further factor was the inconsistency of the work requiring enterprises to tool up for bursts of activity followed by long periods of inaction.

In these interactions the issue of infrastructure came up more directly with respondents indicating that poor quality, high cost and limited access were all issues that constrained firms in being more competitive (supported by results from various enterprise surveys). The remoteness of many mines made issues of transport a particular concern and the issue of the very poor infrastructure in towns near mines or along major routes was a key factor in reducing many firms' abilities to grow their businesses. In these discussions it was noted that the issue of hard infrastructure was as much of a concern as the issue of its management and maintenance – perhaps with the exception of telecommunications infrastructure.

As with the mining companies there was awareness of the corridor concept although the degree to which it was being operationalised and implemented was in some doubt. Once again there was agreement that infrastructure was getting attention in government budgets but there appeared some resignation that it would take a long time before these changes were at scale enough to help the majority of firms. Here the point was raised that should the corridor process proceed it should also explore delivery and improvements to infrastructure that small local firms needed not just what the big mining companies wanted. So this would mean more link roads, railway sidings, extending services in towns adjacent to the corridors and allowing for recognition that small business could not carry the same cost burdens as mining companies.

5.4.2 Perspectives of Government departments on linkages

As with the domestic business organisations government officials tended to express considerable concern at the low level of benefit from mining operations. In a number of cases it was argued that the mining companies appear to want as little as possible to do with local enterprises. Efforts around linkages were suggested to often be little more than window dressing. It was felt that linkages that had been initiated were often the result of government pressure but still fell short of needs. Mining Development Agreements did specify that local procurement should be encouraged but mining companies tended to offer what the respondents saw as excuses such as the poor quality of local suppliers to avoid making greater commitments. The overriding view was that the companies were seen to be very profitable and that they

should carry the burden of supporting more enterprises to contract with them and also transform their management and ownership to the benefit of local Tanzanians. Interestingly, an advisor to the Finance Ministry pointed out that in policy terms most effort was put into issues around revenue sourcing from mining and suggested that in fact linkages was not necessarily such a prominent issue when it came to dialogue between the mines and government – something the mining companies themselves pointed out.

On the issue of infrastructure as a barrier there were some respondents that recognised this as important. In particular those working more closely with infrastructure accepted that the coverage and quality of infrastructure would be a major burden on local firms wishing to supply the mining sector. However, some respondents suggested that the issue of infrastructure was not such a barrier when compared to the approach of the mining companies who were unwilling to substantially increase local procurement. Notably the issue of corridors received mixed responses from government officials. Some suggested that it was no longer a current policy priority after the departure of both South Africa's former president and his colleague the former president of Tanzania who had both championed the concept. Whilst infrastructure investment was a strategic priority in the Mkukuta (or the National Strategy for Growth and Reduction of Poverty) the matter of corridors was not prominent in recent versions. However, some government departments indicated that in fact the corridors were getting more institutional investment and commitment than had been the case previously and there was support from some policy advisors for this concept to be placed at the centre of Tanzania's development plans. The corridor concept were recognised by some respondents as being important to local enterprise in that they would work to reduce obstacles to commerce between regions and thereby enable greater connectivity provided the institutional, policy and budgetary arrangements were in place.

5.4.3 Multi-lateral institution representatives and expert advisor perspectives

Interestingly, this group tended to echo the view that linkages with the mining sector were a rarity and were not a significant element of the importance of the sector in the country at present. However, it was widely acknowledged that the growth in the mining sector did provide an opportunity to upgrade local businesses and grow the local productive sector. Some respondents argued that the main barrier was the weak business climate in the country with issues of red tape and infrastructure being mentioned consistently. Others suggested that both the mining companies and the government and donor community needed to be more proactive in engineering linkages citing examples with Tanzania Brewers and the Kilombero Sugar Mill Outgrower programme.

The issue of infrastructure was raised as has been already mentioned. However, there were a wide range of views as to what was most important. Some argued that the regulatory environment and the limited role of the private sector needed attention arguing that improvements would follow. For others there was an ongoing important role for the state to invest in infrastructure but also to partner with private providers and potential bid users. The corridor concept was seen as offering a useful model but it appeared that there was not the level of support for integrated decision making that had been witnessed in corridors such as the Maputo Corridor. There was also

inadequate trust at a regional level that could translate into the necessary collaboration between countries that the corridor concept would require to be viable.

5.4.4 Summary of respondent category responses around linkages and infrastructure

A table which provides a summary of respondent feedback generated through the research on the major research questions is provided as Appendix 1.

6 Analysis of the interaction between infrastructure in the CDC and mining investment and its impact on linkages

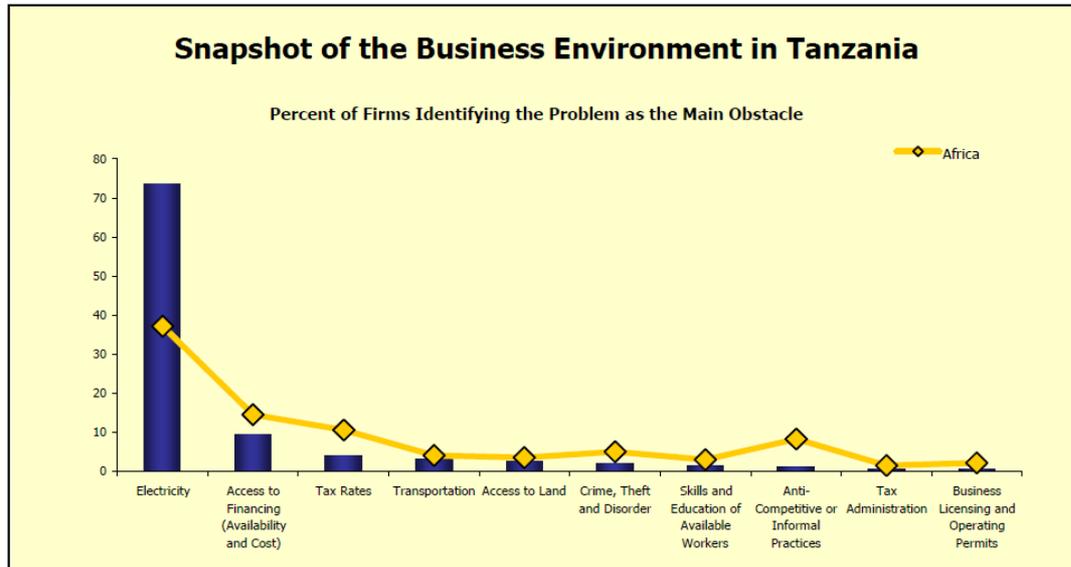
The following section explores the degree to which the case of the CDC supports the claim that a focused degree of attention on infrastructure through the corridor development framework yields improved linkages between mining companies and domestic enterprises.

6.1 A cul-de-sac for now

The relationship between mining investment, linkages with domestic firms and infrastructure is both straightforward and complex. This report seeks to understand the role of infrastructure in the form of corridor development as an enabling factor in supporting linkages. Both the field work and the survey of literature and varied documentation reinforces the claim that shortcomings in Tanzania's infrastructure constrain growth and firm productivity. This holds true for small business and for major mining companies and their partners. The quality and accessibility of infrastructure contributed to particular allocative choices by mining firms which it appears does militate against contracting firms that might be particularly exposed to risks associated with infrastructure challenges. Mining companies place considerable priority in using rent accrued from their activities to reduce exposure or to overcome these challenges. It goes without saying that the bulk of domestic enterprises have neither the resources nor the expertise to reduce such risks and so bear the burden of absorbing these and their associated costs. The dispersal and remoteness of much of the mining activity aggravates these barriers and many local enterprises do not have the scale contracts to help offset some of the costs that come with the resultant challenges. For example Sodexo, a multi-national enterprise that provides catering and mine accommodation-related services, might have warehouse stores available in Dar es Salaam and at other operational sites that could be moved around to meet particular shortages or use its continental distribution network as a back-up. A small supplier to Sodexo unable to make a delivery might find its contract easily replaced from within Sodexo's global supply network.

In parallel to these challenges there are real constraints on productivity activity of domestic producers and service providers which do not always relate to infrastructure. The relatively weak performance of the country in investment climate and business environment surveys suggests that some of these are very significant. However, even in these surveys the issue of infrastructure comes up as very significant.

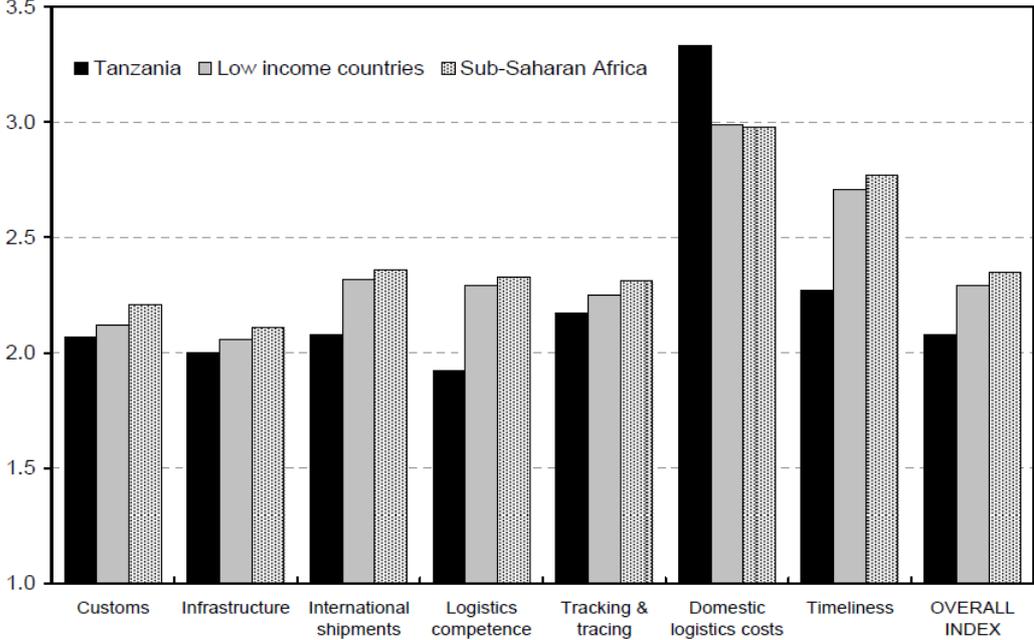
Figure 14. Business environment issues in Tanzania



(Source: World Bank, 2006:4)

The country's weak infrastructure performance was evidenced by numerous surveys. For instance, Ter-Minassian et al (2008) argue that, "Despite its geographic advantages as a potential entrepôt to its landlocked neighbors Burundi, Rwanda, Uganda and Zambia, as well as the D.R. Congo, there is clear evidence to suggest that Tanzania's lack of infrastructure is acting as a constraint on the expansion of trade and economic activity in both the country and the region." (Ter-Minassian et al, 2008: 8) Pedersen quotes Mwase as saying that the passability of Tanzania roads declined from 70 percent in 1970 to 30 percent in 1991 (Mwase in Pedersen, 2001: 12). The World Bank's Logistics Performance Index (Arvis et al, 2007) ranked Tanzania's transport infrastructure well below the average of other sub-Saharan African and low-income countries (see Figure 13 below). In the power sector losses from power failure amount to 10 percent of sales for the median Tanzanian firm compared to only one percent for the median Chinese firm (Eifert, Gelb & Ramachandran, 2005). However, it should be noted that efforts are showing some result as in the 2010 World Bank Logistics Performance Index (Arvis et al, 2010) Tanzania was reported as showing improvements related to its road network and port, although the country only just made it into the top hundred from its previous low base.

Figure 15. Tanzania's logistics performance relative to SSA
Figure 1: Logistics Performance Index
(2007)



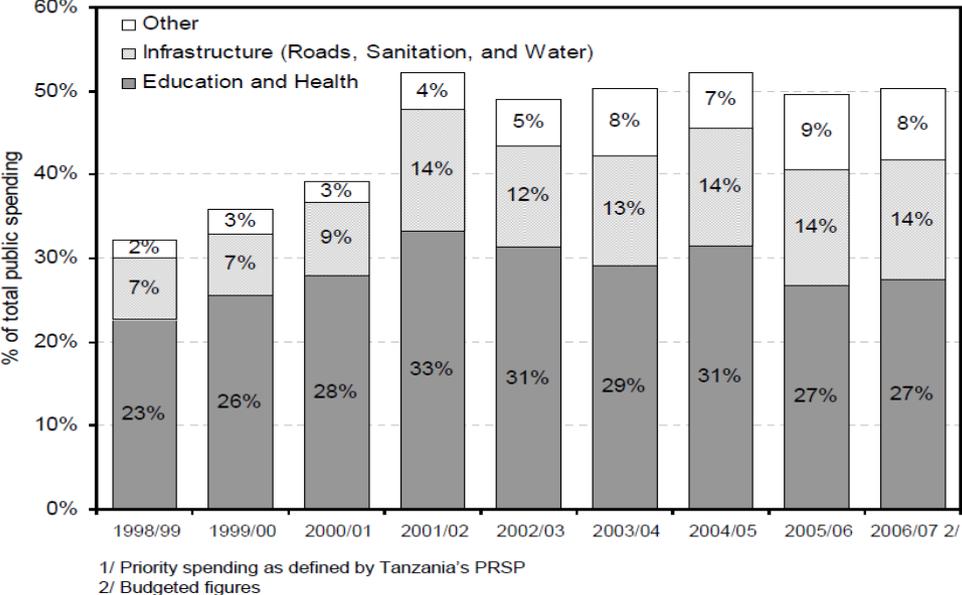
Source: World Bank's Logistics Performance Index.

(Source: Arvis et al, 2007)

These challenges are directly reflected in the highly pressured Tanzania budget where infrastructure spending must compete with a range of domestic priorities and donor agendas. As has been stated elsewhere the share of spend on infrastructure has close to doubled during the decade (see Figure 16) suggesting that growing revenue from debt relief and higher revenue receipts during the higher economic growth years have had a direct association with more spending on infrastructure. However, according to IMF analysis water and roads budgets have not increased since 2000/01, and only twenty percent of the budget amount has gone to capital projects with the remainder to maintenance.

Figure 16. Share of Tanzanian public spending on infrastructure 1998/99 – 2006/07

Figure 8: Tanzania: Composition of Priority Spending 1/



(Source: Ter-Minassian et al, 2008:20)

These challenges are unlikely to disappear in the next decade. Nevertheless, it is clear that the combination of infrastructure investment and mining investment has brought gains to the Tanzanian economy. However, the association between the mining activity in the country and the productive capacity of domestic firms remains relatively tenuous. Ongoing attention to infrastructure matters are likely to support greater linkages – if only through the effect of improving the productivity of Tanzanian firms and thereby enhancing their capacity to secure business from the mining companies. The present day initiatives associated with the Central Development Corridor offer an opportunity to focus both investment and coordination along an axis that is likely to enhance investment prospects in mining (for instances in making it possible for smaller/intermediate mining players to enter the market) as well as create enhanced conditions for enterprises to operate. The design of investments and support programmes alongside the coordinated investment proposed can also enhance the degree of inclusion of enterprises such as rural producers and smaller suppliers – who might not be able to contract with mines directly, but could better service opportunities stimulated by mining activity.

The corridors under consideration are conceptualized as servicing the wider East African region and opening up scale investment opportunities in mineral exploitation that are unlikely to be viable on an individual basis. Should these be effectively synchronized in diplomatic and investment terms the scale of market opportunities for firms in the region will grow substantially. As it is the remnant colonial infrastructure at present does not even support (at least in rail terms) the activity it supported in the colonial era. The challenges to develop the corridors require the connecting of investment in infrastructure with development of mining opportunities. The more limited the reach of the corridors the greater the likelihood that the linkage potential will remain constrained.

At the point of writing this report the findings generated from the research process have led to the following findings:

- The character of the mining activity in the north-west gold mining area of Tanzania was generating only limited linkages with domestic enterprises. Although this was growing from a very low base it was reported by most respondents as being further undermined by shortcomings in infrastructure both affecting the mining strategies of the mining companies and the domestic enterprise sector.
- The CDC process and a greater commitment to infrastructure spending by the Tanzanian government and its donors had witnessed widespread efforts to enhance the integrated infrastructure offerings within the corridor and their related performance. However, the enormous backlogs and the scale of investments and capacity enhancements required have tended to see these efforts only having a marginal impact.
- The lack of economic thresholds in infrastructure use that would be generated by large-scale bulk mining operations – such as those with the Richard Bay Coal line and the Sishen Iron Ore line in South Africa – make the realization of significant enhancements to the entire CDC a major challenge. Although such mineral resources do exist in the East African region served nominally by the CDC they require a combination of diplomatic alignment and innovative multi-lateral development financing agreements to help secure the capital investment in infrastructure that would make the mining of the commodities anything other than wishful thinking.

It is for this reason that the original terms of the study concluded with something of a cul-de-sac in that the expected connections that envisaged in the conceptualization of the Central Development Corridor appeared not to have yielded the level of progress required to make infrastructure investment viable in a manner that would in turn enable further domestic linkages as a result of mining investment. Under these circumstances the prospects of further widening the benefits of the CDC are likely to be considerable constrained.

These conclusions were interrogated in some depth within the Making the Most of the Commodities Programme research process. In an effort to test the core research questions in a different context a decision was taken to examine them in the light of a scan of other potentially comparable experiences in the region. The authors exposure to the rapidly growing investments commitments in the Tete coal mining area of northern Mozambique presented some interesting potential comparative potential. Here was a different commodity being mined with different mining and logistics dynamics to gold in an area with severely degraded infrastructure and remote from major economic nodes. The section which follows provides an overview of this experience and suggests that in comparison with the CDC that some of the potential linkage connectivity can be possible should the appropriate conditions be in place.

7 Reflecting on the CDC findings in the light of the experience of the Tete/Zambezi Corridor in Mozambique

The Central Development Corridor was originally selected because of three main factors:

- an apparent high level of public sector commitment in at least Tanzania and Rwanda²⁸ to the adoption of a development corridor methodologies;
- the existence of a functioning (albeit very inefficient) multi-modal transport corridor infrastructure system; and
- a growing gold mining sector in north-west Tanzania with an impending anchor investment in a large-scale nickel mine in north-west Tanzania (alongside other nickel and gold prospects under advanced exploration in Burundi and the eastern DRC respectively).

However, as has been outlined in the previous section, during the research period a number of factors combined to undermine the viability of this corridor as a candidate to demonstrate the potential utility of the development corridor methodology and the relationship between commodity extraction projects, infrastructure and linked economic development in other economic sectors. In addition to the findings presented above other factors included the mineral commodity price crash that occurred during late-2008/early-2009 following a slump in demand associated with the global financial crisis. In this period Nickel fell from its highs of \$54000/tonne in mid-2007 to less than \$9000 per tonne in early-2009. This led the sponsors of Kabanga Nickel (Xstrata) to substantially review its plans and commission a major revision of its feasibility study. A relatively slow recovery in Nickel prices and large global nickel inventories have undoubtedly delayed this project and as a result the role of this project as an anchor for the CDC has been somewhat diminished even if only temporarily.

A further factor was the severe damage to parts of the Central railway line²⁹ as a result of flooding following heavy rains during December 2009. While some repairs have allowed resumption of operations on part of the line, the line remains closed to through traffic until today. This situation has clear implications for any “railway dependent” development (such as Kabanga Nickel) and efforts to promote the corridor as a viable alternative to the Northern Corridor. Added to this are the problems experienced over the past few years with the under-performing Tanzania Railways Limited (TRL) rail concession that has recently seen the termination of the IFC-funded 25-year concession agreement. A number of options, including re-concessioning, are being considered as a precursor to the rehabilitation and re-development of the railway line. However, during the period of this research, the prospect for the restoration and development of the railway line receded rather than advanced owing to the combination of economic and natural factors described above.

²⁸ Burundi and the DRC, participating at a lower level at the time owing to ongoing political instability

²⁹ Most notably at Kilosa in the Morogoro region and Gulwe in the Dodoma region

This cul-de-sac drove the researchers to examine more closely emerging corridor experiences from the region and settled on the corridor associated with the Zambezi River Valley and the rapidly growing coal mining operations in and around Tete in north-west Mozambique (see Figure 17 below for a map). Although this additional investigation was by no means as in depth as that associated with the CDC, the authors had the benefit of exposure to the area and work being done through advisory work being done, supported by various donors, with the Government of Mozambique. As such the research questions were not only examined in the light of some documentation and the authors' field experience, but were also tested, where possible, in discussions with government officials, multi-lateral agency staff and mining company staff.

Figure 17. Map of Mozambique



(Source: <http://www.mapsofworld.com/mozambique/mozambique-political-map.html> accessed on 12 January 2011)

7.1 What was found?

The following table provides some comparative reflection of the contexts from the two studies. This is useful to keep in mind when exploring the emerging results from the two contexts. What is particularly notable is that there are a variety of different contextual factors that predominate in the two research contexts. These will carry through into the reflection of the findings discussed towards the end of this section.

Table 6. Comparison of contexts: Tanzania and Mozambique study areas

Context	Tanzania (CDC)	Mozambique (Zambezi/Tete SDI)
FDI (2005;2008) USD millions*	498; 744	108; 587
Mining commodity	Gold	Coal
Mass measure of output	ounces	tonnes
Logistics character of existing mining	Input import dominated	Output bulk export dominated
Infrastructure mix requirements of mining type	Road dominant because of lower export volumes with existing gold mining.	Rail dominant because of volumes from coal mining.
Existing available infrastructure connecting mining area to coastline	Weak with some road functionality (rail largely dysfunctional at present).	Weak with some limited rail and road functionality.
Source of multi-national investment in mining	Europe and North America	South Asia and Latin America
Character of public policy	Very cautious around mining and seen as competing with needs of public sector from agriculture.	Oriented to incentivise large-scale FDI projects to help drive modernisation of the economy.
Policy around investment in infrastructure (general)	Growing slowly from a low base. Have experimented with PPP on rail but failed.	A decade of exposure PPP through Port of Maputo and Maputo Development Corridor.
Policy around infrastructure to support mining	Tendency to require mining companies to make their own plans.	Government agreement with CVRD/Vale committed the government through CFM ³⁰ to upgrade Sena Rail line via concession. ³¹
Linkages policy framework	Emerging belatedly in local policy.	Experience from the Mozal aluminium programme intended to be carried into policy on mining.
Approach of multi-nationals	A belated focus on linkages and low commitment from finance partners to cost sharing in infrastructure.	A stronger internal focus on linkages and direct experience in co-funding and management of infrastructure (eg Vale in Brazil and Australia).
Corridor authority	Programme exists under the National Development Corporation, Corridor Authorities under Transport Ministry.	Not yet established but SDI Programme based in Ministry of Transport mimics the corridor programme (to be possibly formalise in future as an authority based on Maputo Corridor Logistics Initiative experience)

(Sources: Authors' analysis; FDI data from UNCTAD, 2009)

7.1.1 Coal mining in Tete Province (Moatize Coal Basin) and Zambezi River Valley corridor

The Lower Zambezi River basin, running through Mozambique and Malawi, is one of the world's poorest regions, yet paradoxically one that is endowed with enormous natural resource and industrial development potential. Vast unexploited deposits of

³⁰ CFM is Portos e Caminhos de Ferro de Moçambique – the parastatal overseeing Mozambican Ports and Railways.

³¹ Although the Sena Rail concession has experienced many problems there has been a high degree of priority given to it by the Minister of Transport to resolve matters and progress the necessary investments.

coking coal, iron-ore, bauxite, heavy minerals sands, phosphates and a variety of other minerals have in recent years attracted keen private sector interest. Exploration on one of the world's largest unexploited coking coal deposits has already resulted in the commencement of construction of two major new coal mines (by Vale and Riversdale) in the Moatize area of the Tete Province. These developments are expected to be followed in the medium-term by similar developments by companies developing other coal resources in the area (such as those at the N'Condezi, Revobue and Jindale prospects).

Furthermore, the Zambezi Valley is the site of a number of possible new hydro and thermal power generation sources³² which, if developed in tandem with expanded power transmission and interconnector infrastructure, could facilitate numerous power-constrained investment opportunities in the region. An opportunity therefore exists to combine what are a complementary set of resources – minerals and inexpensive power – to enable a range of possible industrial development projects³³ both locally, elsewhere in Mozambique and in the wider region that could provide the basis for both sustainable national economic development and enhanced regional economic integration through hinterland linkages into Malawi, Zambia and Zimbabwe.

However, the Zambezi River Valley is also an area underserved by infrastructure. Existing transport, energy and ICT infrastructure is wholly inadequate to meet the requirements of the mining industry in the first instance and the wider economic development potential that could be realized in the medium to longer-term. In configuring its response to the infrastructure development challenges, the Government of Mozambique is acutely aware of the need to enable mineral investments and related large-scale infrastructure investments but at the same time avoid “enclave” development and maximize the extent to which the backward (upstream), forward (downstream) and inter-sectoral economic linkages that these investments enable can be developed. Of particular interest in this regard is the extent to which the mineral investments can trigger “feeder” infrastructure development servicing the agriculture, forestry and agro-processing sectors to enable the realization of their wider inherent economic and social development potential. With this in mind, the Government of Mozambique is pursuing three originally distinct but currently integrated development corridor initiatives in the area, namely: the Beira, Nacala and Sena-Zambeze Spatial Development Initiatives (SDIs)³⁴.

The Moatize coal basin is regarded as one of the last great unexploited coal reserves in the world. Predictions are that it could even become a more important coal producing region than the Bowen Basin in Australia. Coal mining at Moatize coal has a long history dating back to the 1950's as relatively small-scale underground operations transporting an aggregate total of 500 000 tonnes per annum on the Sena railway line from Moatize to the Port of Beira for regional consumption. Production

³² Benga and Moatize thermal power stations and the Mphanda Nkuwa and North Bank Cahora Bassa hydro-power projects. South Africa developed a similar set of projects during the 1980s and early 1990s such as aluminium smelting and chrome production.

³³ Including coking, direct reduced iron and steel plants, aluminum smelting, cement, fertiliser, ceramics factories, etc. (Mintek: A Scan of the opportunities Arising from Resource-based Projects in the Zambezi Valley in Mozambique, July 2004).

³⁴ Under a new Mozambique SDI programme led by the Ministry of Transport.

was however disrupted and eventually ceased (in 1983) during the protracted independence struggle and subsequent civil war. In recent years a few very small-scale operations have produced coal for the local market. The feasibility of large-scale, open cast production was first investigated in the early 1990's with the advent of peace and security in Mozambique following the end of the civil war. As the investment climate improved through the 1990's the coal reserves at Moatize attracted more and more investor interest from amongst others, Billiton, JCI and CVRD³⁵, all of whom showed keen interest in securing rights to the Moatize project. But during the remainder of the 1990's and early 2000's the Government of Mozambique was unable to attract a company to develop the Moatize mine.

In 2003 a breakthrough was achieved when the Government of Mozambique commissioned the IFC³⁶ to advise on a process by which to secure a developer and set conditions for the successful development of the Moatize project. The Government saw this project as the anchor project for the development of the Zambezi Valley³⁷, one of the least developed and most populated regions of the country (with approximately 4 million people living off subsistence agriculture) ravaged by the 15-year long civil war.

In the event ten mining companies presented their credentials for prequalification, four were prequalified and submitted bids under a complex framework for evaluation. CVRD³⁸ was declared the winning bidder, having bid \$123 million for the right to explore and develop the coal deposit and on 27th November 2004 entered into a Framework Agreement on the Moatize Coal Project with the Government of Mozambique³⁹. The proposal also included conducting an integrated feasibility study for the coal project, commitment to the development of associated rail and port infrastructure and pre-feasibility studies for a 1500 megawatt coal fired power station and other industrial projects.

In December 2007 Vale obtained all necessary licenses from the Government of Mozambique for the construction of the new Moatize mine and after spending more than \$80 million on their feasibility study, in August 2008 commenced construction of the estimated \$1.5 billion project. In early 2009, Vale contracted a consortium of two major Brazilian construction and engineering groups, Odebrecht and Camargo Corrêa, to undertake the civil engineering and construction work, which will include the construction of one of the biggest coal handling preparation plants in the world, which will have a capacity of 26 million tonnes per annum. Construction continues today and first output is expected in third quarter this year.

Reaching the agreements with CVRD/Vale also signalled to other investors Mozambique's international visibility as a coal producer. This has spurred a rapid

³⁵ Also known as Companhia Vale Do Rio Doce or Vale.

³⁶ See the following link for further information:

[http://www.ifc.org/ifcext/psa.nsf/AttachmentsByTitle/PPPseries_Moatize/\\$FILE/SuccessStories_Moatize.pdf](http://www.ifc.org/ifcext/psa.nsf/AttachmentsByTitle/PPPseries_Moatize/$FILE/SuccessStories_Moatize.pdf)

³⁷ And under a bilateral agreement with the Government of South Africa launched the Zambezi Valley SDI to investigate other economic development potentials in the area.

³⁸ Companhia Vale Do Rio Doce now known as Vale.

³⁹ Framework agreement for the Moatize Coal Project between The Government of the Republic of Mozambique and Itabira Rio Doce Company Limited and Companhia Vale do Rio Doce, Moatize, November 27, 2004.

increase in the number of companies seeking participation in the development of the country's coal reserves. As a result, there has been an explosion of exploration interest with 82 coal exploration licenses being granted to 33 companies.

Riversdale, an Australian based junior mining company holds multiple licenses in the Moatize Basin but is currently focused on two projects: Benga (in partnership with Tata Steel), adjacent to the Vale Moatize project with a coal resource of 4 billion tonnes⁴⁰ and reserves of over 500 million tonnes, where the company holds a 25-year mining license. Mine construction has started and production will be ramped up from 1.4 mtpa in 2011 to 20-30 mtpa by 2020; and the Zambezi project (under an MoU with China's Wuhan Iron & Steel Corporation) where the company has a coal resources of approximately 9 billion tonnes. Riversdale is currently subject to an approximately \$4 billion takeover bid by Rio Tinto.

The Ncondezi coal project is expected to be the third coal mine to come on-stream after Vale and Riversdale. Expected life of mine is 37 years based on a 10 mtpa production of coking and thermal coal. Still to complete its bankable feasibility (expected in 2012) commencement of construction and production remains two years away. When developed this mine would require construction of a 10km railway spur to link to the existing Sena railway line to Beira.

The Revuboe project is also located close to the Vale and Riversdale operations at Moatize. A joint venture between the Talbot Mining Group (66%), Nippon Steel (26%) and Posco (8%). Bankable feasibility is still to be established but early indications are that production could ramp up from 2 mtpa in 2014 to 20 mtpa in 2020.

Jindal Steel & Power (JPSL) have acquired a mining concession approximately 100 kilometres from the town of Tete close to the Cahora Bassa dam. The company plans to commence production in 2012 and produce 10mtpa at full production, two-thirds of which is saleable. This project however faces serious transport constraints there being no rail link across the Zambezi River to access the Sena railway line.

Thus in summary, and acknowledging that data provided by mining companies regarding exports should be regarded as optimistic and that coal deposits do not necessarily guarantee exports, it is conceivable that coking coal and high grade steam coal exports from the Zambezi Valley could reach as high 130 mtpa by the year 2020⁴¹. Market conditions are currently favourable given the high demand (and rampant prices) for coking coal and are expected to remain buoyant in the long-term.

7.1.2 Infrastructure constraints and challenges

Despite the fact that the coal mining investments and related commitments to export coal by Vale (Moatize) and Riversdale (Benga) should have enabled necessary investments in railway, port and energy distribution networks, and the fact that in the CVRD/Vale case commitments were made by the Government of Mozambique,

⁴⁰ Date reflecting resource estimates, planned production and ownership structures for various coal mining projects obtained from DFID Mozambique SDI (Stern, O), Moatize Coal: Issues & Options Paper, November, 2010.

⁴¹ Estimated from figures provided by the six "lead" mining companies currently developing projects in the Zambezi Valley

these have not yet taken place. As things currently stand, there is insufficient capacity to handle projected exports even in the short-term. Moreover, there is no clarity on how rail and port capacities will be developed over the medium to long-term to handle the rapid growth in production and exports that has been predicted beyond the commissioning of the Moatize and Benga mines.

To a large extent the identification of the necessary solutions has until recently been bedevilled by a lack of coordinated planning within government and between government, some of its parastatals and the private sector. An underperforming rail concessionaire has also made finding a transport and logistics solution impossible until very recently.

In mid-2004 just before the awarding of the Moatize coal concession to CVRD (Vale), the government of Mozambique awarded a concession to operate the Sena (Moatize-Beira) and Machinpanda (Zimbabwe-Beira) railway lines to a joint venture company Companhia Dos Caminhos De Ferro Da Beira (CCFB). Two Indian State-owned companies, RITES (26%) and IRCON (25%) held a controlling interest and the Government of Mozambique retained 49% through its ports and railways parastatal, CFM. The concession entailed the rehabilitation of the railways system that had been ravaged by the civil war, operation, management and maintenance of the system for a concession period of 25 years. This was to be financed through a combination of a soft International Development Association (IDA) loan⁴², shareholder equity and commercial borrowing.

The awarding of this concession immediately made the Moatize coal project dependent on this railway investor for its connection to the port of Beira. Recognising the risk that this introduced to their project CVRD (Vale) negotiated the inclusion of certain warrants in their concession agreement with government which were intended to guarantee the development of the Sena railway line to handle expected growth in coal export volumes. In the event this did not happen and the underperforming concessionaire only recently (2010) completed the rehabilitation of the Sena line to its 6 mtpa design capacity. By all accounts the rehabilitation work that has been undertaken is inadequate to allow for the running of coal trains on the line and Vale estimate that it is necessary to spend up to a further \$40 million to upgrade the line to the necessary specifications and standards.

However, needing to reduce the risk associated with dependency on the Sena railway line and faced with the challenge of even a fully functional Sena railway line not being able to handle the projected export volumes, the lead investors are also looking at alternative options:

- Expanded Sena Line - On its current alignment with existing curves and gradients, the development of additional passing loops could see the Sena line capacity increased from its existing 6mtpa to 12mtpa. While this would allow increased exports it would not be sufficient in the medium to long-term.

⁴² World Bank IDA loans were initiated for the world's poorest countries in 1960 and generally carry low or zero interest over an extended repayment period.

- Rail link to the Port of Nacala - Vale are investigating the feasibility of developing a new 30-35 mtpa capacity rail line linking Moatize across Malawi, back into Mozambique to join the Nacala railway line enabling coal exports through the port of Nacala. In support of this initiative, Vale have recently acquired a controlling interest in the Nacala railway (and port) concession company Corredor de Desenvolvimento do Norte (CDN), presumably with a view to controlling coal transport logistics on this line in the future. Under this scenario Vale would also build and operate a new coal terminal at the Port of Nacala.
- Barging on the Zambezi River – Attracted in part by the low operational costs, Riversdale have investigated the feasibility of running tug and barge operations on the Zambezi river transporting coal from Benga to a coal terminal at or near Chinde. Some doubts exist as to the technical feasibility and environmental integrity of this option.
- New dedicated railway line to Savane – investigated in the 1990's by JCI who were interested in the Moatize project at the time, this entails building a dedicated coal export line of between 20 & 40 mtpa to a new port at Savane north of the existing Port of Beira. Currently being investigated by an independent third party who has solicited a memorandum of understanding with the Ministry of Transport and Communications.
- Slurry Pipeline – investigations are being undertaken by independent third parties into the feasibility of a coal slurry pipeline. However, in addition to the high capital costs, technical questions related to the friability of coal and environmental issues still need to be addressed.

7.1.3 Government's Response to the Immediate Transport Logistics Challenges

With the lead private sector investors and the relevant concession companies failing to reach agreement on the transportation of export coal, the Government of Mozambique, led by the Ministry of Transport & Communications, has identified as a priority the development of a transport and logistics master plan for the Zambezi Valley. Government also recognises that individually, none of the identified transport infrastructure options provides a comprehensive solution in the short, medium or long-term. However, the Moatize and Benga mines will be commissioned within the next 6-12 months and therefore the Government of Mozambique also acknowledges the need to focus on finding short-term solutions while simultaneously determining the longer-term transport and logistics master plan. A number of short-term measures are being considered:

Termination of the CCFB Concession Agreement

The Government of Mozambique has recently given notice to the concession company CCFB of their intention to terminate the concession agreement. This measure has been taken cognisant of the need to place the Sena line under a more appropriate management/concession agreement that services the needs of the coal mining and other users in the short-term. A ninety-day window during which CCFB has the opportunity to make good its performance shortfalls (but is not expected to)

expires on 24th March 2011 after which the concession is terminated. Given that both Indian companies are state-owned, diplomatic exchanges have been held to facilitate termination.

Sharing Sena Line Capacity

Government has sanctioned an agreement between Vale (4 mtpa) and Riversdale (2 mtpa) to share the 6 mtpa capacity on the Sena line in the short-term and has consented to them operating their own trains on the line with the parastatal CFM assuming overall management control of the rail system. Under this scenario, necessary outstanding upgrades to the line are to be financed by the mining companies paying track access fees in advance for a 24-month period. This will allow for the urgent upgrade of the line to enable the transportation of coal to the port of Beira. Beyond that, financing options to upgrade the Sena line to a 12 mtpa capacity are being considered by government in conjunction with the mining companies.

Zambezi Logistics Company

The Government of Mozambique wishes to optimize the developmental impact of the mining of the coal resources of the Zambezi Valley and avoid the “enclave” development that has historically characterized minerals extraction in Africa. Central to the achievement of this objective is the maximization of the competitiveness of the Mozambican mining industry through the achievement of the lowest-cost logistics solutions possible. The Ministry of Transport & Communication is investigating the possibility that establishing a multi-user logistics company to manage operations on the Sena line and Beira coal terminal may be the best means to achieving this outcome.

Unsolicited Proposals

The Ministry of Transport & Communications is in receipt of a number of unsolicited proposals in which independent third parties seek Memoranda of Understanding in order to commit resources to determining feasibility of some of the proposed coal transport options described above. The Ministry is treating these on their own merits but at the same time is evaluating them to avoid an outcome where any given transport solution serves only the narrow interests of the “pioneer investors” and “sterilises” other economic opportunities or denies positive externalities for other sectors.

Surface Transport Regulator

The Ministry of Transport & Communication is also finalising preparations for the establishment of a single surface transport regulator. Until now different entities have regulated the different modes of surface transport and this has placed certain executive agencies, such as CFM in a conflicted position where they are participants in a concession but are also the concessioning authority (on behalf of government) and perform a regulatory function. Furthermore, given the agreements that are being entered into between government and the mining companies and other third parties,

establishing a regulatory regime that maximises economic returns and the public interest is crucial. The establishment of a strong, independent regulator is vital.

In addition to these short-term measures, the Government of Mozambique wishes to develop longer-term minerals transport and logistics solutions that are part of a wider, more integrated economic development strategy for the Beira, Nacala and Zambezi Valley Development Corridors. In this regard it has arrived at two key policy conclusions, namely: that Mozambique needs to use its comparative advantage in natural resources as a catalyst for diversified economic growth and development; and that any strategy to promote infrastructure development must be informed by its economic context. This reflects a clear recognition of the inter-relationship between natural resource investment and infrastructure development and has been captured in the recently adopted “Strategy for the Integrated Development of the Transport Sector”.

This new strategy also recognises the role of the transport sector as a key determinant of social and territorial cohesion, economic competitiveness and the imperative for regional integration. It aims to develop an integrated transport system that facilitates investment and the further growth of the national and regional economies, simultaneously reinforcing SADC attempts to promote regional economic integration while also responding to the needs for energy efficiency and security. This marks something of a departure from tradition in that the strategy was defined taking into account both the declared strategies of other sectors such as mining, agriculture, tourism and public works, and also the high levels of investor interest in the exploitation and development of Mozambique’s natural resource sectors. Furthermore it explicitly advocates the adoption of development corridor planning methodologies⁴³ focusing on integrated planning and management of transport, energy and ICT infrastructure development with linked anchor investments (particularly those in the natural resource sectors) by the private sector.

This approach, adopted by the Government of Mozambique at the highest level, is not common and displays a much higher level of commitment than that seen in Tanzania where the development corridor approach is not clearly mainstreamed into the policies and strategies of the Government there. In Mozambique the Cabinet has approved the establishment of the Mozambique SDI Programme in the Ministry of Transport & Communication with implementation to be co-managed with the Ministry of Planning and Development. The Programme has already commenced with a range of sector scoping studies to deepen the understanding of the range of economic development possibilities that exists on the corridors that make up the Programme. These will, in turn, inform future infrastructure development strategies.

7.1.4 Linkages and Associated Dynamics

While the concession agreement entered into between CVRD (Vale) and the Government of Mozambique required the company to make strong commitments to community and social development and to sound environmental management, in this

⁴³ In particular the Spatial Development Initiatives methodology successfully applied previously in Mozambique on the Maputo Development Corridor in partnership with the Government of South Africa.

instance they have also displayed a strong willingness to “partner” the government in a number of non-mining initiatives.

Firstly, at a high level and because of the competence they derive from being Brazil’s biggest transport logistics company (operating four railways, two iron-ore terminals and a number of other general cargo ports), Vale have shown a willingness to assist the Government of Mozambique to resolve necessary transport challenges threatening to sterilise major new coking coal mining investments by participating in the provision and management of transport infrastructure. Of course this is in their own direct interest but they have not sought exclusivity, instead agreeing to a shared arrangement with Riversdale regarding the future utilisation of the Sena railway line and Beira coal terminal.

Secondly, and albeit that the company needs to valorize the “discard” thermal coal that cannot be exported, Vale committed itself to carrying out a feasibility study for a mine-mouth coal fired thermal power station. Part of the envisaged 1500 megawatts produced will be used to power their mine with the majority available for sale. Concurrent upgrades to the Mozambican transmission infrastructure have been timed to allow for the distribution of the power produced but the key challenge is securing off-take agreements that will make the power station development viable. This also applies to Riversdale who are also planning to develop a thermal power station in partnership with ELGAS.

Thirdly, Vale has also acquired the mineral rights to the Evate phosphate deposits (located close to the Nacala railway line between Nampula and Nacala) and a 50% (\$400 million) stake in the Konkola North copper mine in Zambia. What these investments indicate is that Vale is taking a wider regional view of opportunities in Southern Africa. Given their recently acquired interest in the Nacala Corridor, the Evate project makes good economic sense, as does the Zambian investment - depending on what development path, the various transport and development corridor follow in the near future.

Fourthly and perhaps most interestingly, the Vale funded Centre for Sustainable International Investment⁴⁴ at Columbia University has commissioned the preparation of a broad-based Sustainable Development Plan for the Lower Zambezi Region. The Plan will make broad-based social, economic, environmental and governance recommendations to the local and national governments for the sustainable development of the region. The goal of the Plan is to identify priority development constraints in the region; suggest development opportunities and areas for private and public sector investment; identify opportunities to improve the integration of local and national development initiatives; and recommend strategies to ensure the sustainability and equity of investments in the region.

Although the research report has not yet been finalised, some of the early indications are that the recommendations will amongst others include:

- Developing planning tools for the transport and energy sectors that enable identification of shared platforms for mega-projects

⁴⁴ A part of the Earth Institute at Columbia University.

- Developing a Corridor Regulatory Framework that promotes maximization of economic development while meeting coal logistics requirements;
- Coordinating donor support to revive stalled energy interconnector projects to enable power constrained projects in neighbouring states;
- Accelerating densification and cross-sectoral linkages through the development of feeder roads to high potential agricultural production areas;
- Establishing a public-private consortium for collaboration to develop SMEs using mega-project supply chains;
- Supporting the identification and evaluation of downstream industrial development possibilities – especially around the steel value chain, phosphate based fertilisers, etc.; and
- Collaborating with government to develop a centre of excellence for vocational training in Tete.

It is also not yet clear whether Vale will take a direct interest or role in implementing some of these recommendations or whether the research report itself will further guide the Government of Mozambique (perhaps through its SDI programme) in its efforts to promote the integrated development of the Zambezi Valley. Nevertheless, possibly because of their size, or because they are headquartered in the South, Vale are displaying a much greater inclination to partner with the government to ensure that their coal mine does not turn out to be an enclave development in a region characterised by extreme poverty⁴⁵. This is distinctly different from the approach of other lead investors in the area, particularly the junior mining companies who are not in such strong financial positions and more often than not have committed virtually all their resources to establishing a bankable mining project.

From a regional perspective, the Sena-Zambeze Corridor lying as it does wholly within Mozambique requires lower (yet still significant) levels of public sector coordination than does a corridor such as the Central Development Corridor traversing as it does, Tanzania, Rwanda, Burundi and the DRC. Through power generation, transmission and inter-connection and by way of cross-border railway links this may change. However, for now the task of coordinating private sector investments with the necessary public sector responses to ensure necessary infrastructure investments is made simpler by the fact that the mining, transportation and export of coal is all taking place within Mozambique.

7.2 What does all this mean in terms of the over research findings?

The findings from the Mozambique case – although somewhat preliminary given the nascent stage of new mining in that country – do however show some interesting contrasts to that of the Tanzanian experience. It is suggested that much of this is driven by the different contexts outlined earlier in this section.

⁴⁵ A Vale executive pointed out to the researchers that the company had no problem developing such partnerships as they were common in the developing world.

In contrast to the Tanzanian experience, the pointers in Mozambique are that there is a closer alignment of transport infrastructure development commitments by government and the needs of the mining companies. In fact in some recent cases, the very investment made by the mining companies has been made possible largely by a series of commitments, by government and the private sector, to a negotiated process to build the collaborative framework for infrastructure investment that would in turn make the mining of a bulk commodity such as coal feasible. In this process it is also notable that issues of linkages not just to other potential bulk users of transport infrastructure such as rail have been given attention, but also linkages in the sense of seeking to make connections with local enterprises both directly to the mining companies as well as to the opportunities that might arise from improved infrastructure (though the merging Mozambique SDI Programme which is devoting a lot of attention to the Zambezi Valley given the private sector demand for support). Although to date these linkage processes are only very embryonic it is important to recognise that they are part of a dialogue whilst the mines and infrastructure are being developed and not only being tapped into in the later operational phase of mines. The factors driving these apparent differences with the Tanzania case are discussed below.

Policy and Political Will Matters

In the case of Tanzania, government is under pressure as a result of perceptions that the country and its citizenry have not benefitted from the gold mining investments. As a result while, the investment climate for further minerals investments remains on the whole positive, recent amendments to legislation and regulation have caused some degree of anxiety amongst mining companies conducting exploration and contemplating new mining investments. Unlike the Government of Mozambique which appears to have embraced the possibility of new coal mining investments and the associated benefits they can bring, the Government of Tanzania does not exhibit the same level of political will and proactive engagement with the mining companies. Governments across the region display significant differences in the level and nature of their commitment to sound minerals governance and the extent to which they support private sector investment in the mineral sector. Similarly they also exhibit differences in the extent to which their policy environments encourage private sector participation in large-scale infrastructure investments in response to new mining developments. But perhaps more critically, even when the policy framework is conducive, different governments display different levels of political will and commitment to proactive engagement and partnership with mining companies. The case of Mozambique is particularly interesting where a progressive Minister has succeeded in motivating a shift in national transport policy to a position where Government not only explicitly recognises the need to use its comparative advantage in natural resources as a catalyst for diversified sustainable economic development, but, where it also recognizes that strategies to promote infrastructure development must be informed by its current economic context.

Ownership matters

Comparative experience in Tanzania and Mozambique suggests that different companies behave differently when it comes to working with governments around shared costs for infrastructure solutions. This may be a function of either the

different financial capabilities of large multinational mining companies and junior mining companies, or, it may also reflect in some instances a closer affinity between mining companies headquartered in the South operating in other countries of the South.

Type of Commodity Matters

The type of mineral commodity matters hugely in so far as different mineral commodities yield:

- differences in the level of demand (and hence economies of scale and viability) they create for the transport and energy infrastructure that their extraction and evacuation to a point of export (and importation of inputs) demands; and
- differences in the extent to which the extraction and possible processing of different commodities can foster backward and forward linkages (and cross-sectoral linkages).

Because of the high and rapidly climbing global demand for coking coal (and to a lesser extent iron-ore) as an input into the Chinese and Indian steel industries and because of the magnitude, quality and favourable geology of the Zambezi River Valley deposits being developed by Vale and Riversdale, a “coal rush” is underway. With 82 coal exploration licenses having been granted to 33 companies, the sheer volume of interest and the prediction that the Zambezi River Valley could outstrip Australia’s Bowen Basin as the world’s single biggest source of coking coal immediately suggests that economies of scale to infrastructure are achievable. As a result, both the public sector (as owners of existing transport infrastructure) and the private sector (as prospective financiers of new infrastructure) are actively engaged with the mining companies.

This contrasts with Tanzania where the Central Development Corridor “depends” more on a portfolio of minerals for which demand although buoyant is not as strong as it is for coking coal and where (in the case of Nickel) inventories are high. Added to that, the number of known nickel deposits under investigation lie across two countries (complicating attempts to promote a “cluster” approach) and no single deposit alone (unlike the case with coal in Mozambique) can yield sufficient output to ensure the achievement of economies of scale and viability of necessary railway upgrades on the Central Corridor. Add to that the complication that known mineral deposits in the eastern-DRC are mainly gold, coltan, cassiterite, wolframite – all high value but yielding low output tonnages and it is clear that the type of commodity matters.

Regional Factors Matter

The extent to which a corridor traverses more than one country and is truly regional in nature also matters. Generally speaking, the more countries a corridor traverses, the greater the requirement for inter-state cooperation and coordination to ensure the efficiency of infrastructure systems. Managing transport or energy infrastructure concessions and PPP investments is considerably simpler on corridors traversing only one country.

Multi-country corridors are also posing greater challenges when it comes to Development Corridor coordination and management. Prioritisation of activities designed to promote the realisation of investment is more challenging. In some instances broader Corridor (regional) development opportunity can clash with narrow national development objectives. In East Africa, EAC member state economies are at very different levels of development. Concerns exist amongst some of the less-developed member states that commitment to regional initiatives may increase their dependency on Kenya which has the dominant economy in the region. This is of particular concern around the development of secondary industry and hence linkage development associated with minerals development elsewhere in the region.

8 Conclusions and Policy Recommendations

The question asked in this study can be phrased as follows: “Does the new round of commodity investment in Africa, often needing further stretching of truncated colonial-era corridors, justify the investment taking into account the broader development needs around strengthening the role of domestic enterprises?” The answer, arising from this study is, “No, not without some sustained and coordinated action.” The somewhat muted evidence from Tanzania and the slightly stronger signals from Mozambique suggest that conscious action is needed to match the potential of a cluster of commodity extraction projects with an imperative to redesign extractive infrastructure patterns to take in a network of hinterland urban centres that help build thresholds necessary for nascent domestic enterprises and also contribute to notions of economic integration.

A reading of material examining economic history of countries like the USA suggests that in the longer term corridors thrive off a measure of balancing of demand and tend to decline under conditions of extreme asymmetry. In this context, infrastructure investments that might be made feasible by mining should be designed to be adapted to needs beyond the mine lifespan. Massive mining projects can play a critical role as triggers for infrastructure investment and can contribute to a temporary balancing of flows. However, in order to generate types of demand that could create a sustainable platform for a wider sharing of benefits along the length of corridors and beyond their poles an imperative exists for a greater degree of aligned action between public and private actors. A wider reading of the literature also suggests that corridors also need to serve as the arteries of processes of urban agglomeration and these can be given important oxygen boosts by demands of the mining sector but unless this translates into more complex development patterns of clusters of other mines and urban settlement, their impacts might be short-lived. The prospects of a sustained commodity boom cycle seen to be a result of demands of the growing economies of India, China and Brazil create a real opportunity for the evolution of strategies to enhance corridor integrity but will require nimble and creative governance responses that have, to a large degree, eluded the region to date.

The policy issues that have arisen through the course of this study have been implied or stated explicitly a number of times in this document. Some of the key elements that have been noted include the following:

- Hard infrastructure requirements (transport & energy) vary per mineral commodity but there are synergies from scale effects in terms of investments

that can support new investment across the region. Using the corridor framework to plan and manage delivery and functionality offers substantial potential benefits as opposed to more fragmented approaches and methodologies.

- Soft infrastructure is also very important and at times more important than Hard Infrastructure (eg custom processes).
- Policy, Legislation & Political will (& strategic intent) are important to send the correct signals from policy makers to investors and enterprise owners. A higher risk policy environment is unlikely to enable the kind of partnership arrangements that both corridors and linkage processes require. The need for effective policy environments also calls for improved spatial planning to underpin and inform corridor development beyond the narrower confines of commodity extraction,
- The widening gap between mineral and infrastructure investment cannot be sustained. To encourage investments that offer a potential to encourage longer term economic structural change there must be greater synergy between plans of mining companies and governments. Mining should not only be viewed as a revenue generator for the state to then make social transfers (which it struggles to do anyway as it does not have a strong enough position to secure strong tax flows), rather the investment must also be also seen as a mechanism to help permanently restructure the economy through supporting a feasibility of infrastructure modernization and through impacts on the domestic productive sector.
- The above points combined with the experiences documented in this study also point to a growing need for deliberate, purpose designed measures to enable combinations of mining investment, infrastructure development and linkages with the domestic productive sector to be engineered as part of an integrated programme. Corridors and Spatial Development Initiatives have tended to prioritise the necessary alignment of infrastructure spend and major FDI projects but without direct attention on measures such as upgrading services to business in corridor associated urban nodes or enhancing connectivity of agricultural regions to corridors their developmental impact might not adequately break with the past experience of enclave development. For corridors to work developmentally the alignment of public and private intentions does not only need to work for mining companies and national revenue authorities but also for networks of smaller-scale enterprises and their associated thresholds of customers.

In the introduction to this document reference was made to this study having been conducted within the framework of the Making the Most of Commodities Project. This project set out a number of hypotheses which were to be tested in the MMCP's associated studies. Whilst this was not a core objective of this particular report the material provided here does offer some potential scope to comment on these hypotheses. With regard to the relations of ownership in the commodities sector affecting the extent to which economies are able to make the most from commodities, this reports comments about the apparent agenda setting differences

between different actors in Mozambique and Tanzania is of some interest. This might be more to do with the different mining sectors these companies might be operating within the different countries and the associated imperatives that come with exploiting different commodities but this certainly does deserve some further enquiry.

The second hypothesis of the MMCP was that the extent and quality of infrastructure affects the extent to which economies are able to make the most from commodities. It is this hypothesis that has been the focus of much of this report and certainly it can be stated with some confidence that shortcomings in infrastructure quality and quantity can limit host country gains. Furthermore, improved attention to these matters – conditional on viability prospects associated with the scale, scope and logistics dynamics of particular mining clusters – opens up vistas of possible benefits to be yielded across a number of domestic development agendas.

This study has little to say in any meaningful terms about the MMCP's third and fourth hypotheses, namely that the nature of linkages between the commodities sector and the NSI in the local economy affect the extent to which economies are able to make the most from commodities, and that skills spillovers from the commodity sector affect the extent to which economies are able to make the most from commodities. However, on a related point it was noted by a number of respondents that both public and private actors appeared to lack the experience and knowledge bases required to marshal discussions and ultimately agreements on how best to direct infrastructure spending in an environment of competing demands. The contribution of various programmes such as those by NEPAD and subsequently by DFID have made some contributions in this regard. This point also has some relevance for the fifth hypothesis which stated that, regional hubs for the supply of inputs and knowledge intensive services and technologies into the commodities sector. The policy experience in South Africa, as a country that has made something of its commodity extraction activities for wider economic benefit, has been influential in countries seeking to think through their options.

The final MMCP hypothesis makes the case that policy affects the extent to which economies are able to make the most from commodities. As with the second hypothesis on infrastructure, this study suggests very strongly that policy can be the critical ingredient that can either hinder deepening of domestic gains from combinations of mining and infrastructure investment or it can play a role to enable a deepening of such benefits. Clearly policy choices are not just about the will of policy makers but are also heavily influenced by the room-to-manoeuvre that policy makers might have. Both Mozambique and Tanzania are countries facing enormous development challenges with little in the way of domestic revenue sources left after seeking to meet pressing social needs. The room-to-manoeuvre is also impacted by the extent to which collaboration across borders can be realised⁴⁶ and by the degree to which commodity extraction dynamics associated with different commodities support thresholds necessary for certain investment choices to be realised.

Historically in Africa, the point of origin of transport-related corridors was more often than not a port or an administrative capital and the termination point more often than

⁴⁶ As was the case with the Maputo Corridor – suggesting a different slant on hypothesis five about the importance of regional hubs can be important to add economies of scale to investment choices in adjacent localities across national borders..

not a mine or a plantation. Levels of interdependency between economic actors in different centres, beyond the most crude, were often not enough to sustain growing the intensity and complexity of exchanges. This study suggests that this interdependency has to be matched by coherent forms of investment support in the form of infrastructure and some level of effective policy in order to generate multiplier effects beyond first round investments. In order for countries to try and seek to harness to opportunities in today's economic geography requires the connection of complex urban settlements and their diverse economic activities with sites of production and as well as other complex urban centres to enable the sustainability of such corridors. Forging of such processes is likely to be highly challenging with competing interests between stakeholders needing different types of functionality such as that between rail and road. However, it is the only way in which incrementally, or in greater surges, functionality on corridors can be enhanced for the benefit of broader economic development agendas.

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Appendix 1. Matrix of responses by respondent category to main research questions

Matrix of responses by respondent category to main research questions

Category of respondent	Domestic firm linkages with mining activity	Drivers of linkages	Constrains to linkages	Factors causing constraints	Infrastructure specific constraints to mining companies increasing local sourcing?	Infrastructure specific constraints to local firms (existing & potential suppliers)?
Gold mining companies & Chamber of Mines	Incremental growth with significant change in depth of foreign suppliers with TZ base. Increase in CSI. Don't forget linkages in terms of hotels, flights, legal services etc.	Responsible corporate citizenship (or pressure from NGOs, shareholder lobbyists etc). Improved experience of what local market can offer and how to interact with local suppliers. Mine maturity allowing lower risk profile and need to be more innovative to cut production costs (as USD per oz. goes up).	Capacity (to supply at volume, with quality and reliably). Firm inexperience supplying mining sector. Certification/skills level.	Weak private sector tradition. Environment tough for small firms. High effort with small return for mine management. Not raised by government as a consistent issue. Corporate procurement model not aligned with linkages development objectives. Risk aversion by procurement staff.	Dysfunctionality threatens lifespan of mines; forces lower tax contributions (because of higher upfront development costs that mine finance used to); requires contract partners with track record and capability depth which impact on demand. Experience is that poor infrastructure makes local suppliers vulnerable.	Adds to costs of doing business – direct costs and reliability challenges). Lack of diversity and density of suppliers in proximity – agglomeration not supported by infrastructure. Mine locations and nearby towns not lend themselves to formal business operating locations.
Bulk export mining companies	Will need linkages (not yet operational)	Scale of operations with substantial input and logistics intensity require localization of many supporting suppliers.	Concerns about the complexity of the business environment. Worries about lack of infrastructure. Cost of supply base because of relative small scale of cluster.	Policy frameworks not supportive enough. Weak state of government finances. Lack of regional cooperation.	A focus on infrastructure constraints as business not viable without major new investments. This investment will bring major benefits to Tanzanian enterprises.	

Category of respondent	Domestic firm linkages with mining activity	Drivers of linkages	Constraints to linkages	Factors causing constraints	Infrastructure specific constraints to mining companies increasing local sourcing?	Infrastructure specific constraints to local firms (existing & potential suppliers)?
Domestic business organisations and entities working with them	Stagnant or erratic linkages between local firms and mines but generally too low	Window dressing by mining companies – no genuine processes. Tendency to use localised trans-nationals.	Lack of effective imposed policy from government (local content). Weak business environment for local firms (finance and support) Lack of investment in infrastructure in commercial and industrial areas.	Lack of political will and imposition of agendas from western donor governments. Profit maximizing agenda of mining companies.	Mines do not share their infrastructure with business in surrounding areas. Mines can carry their own infrastructure – government must invest in infrastructure for local firms.	Local firms carry the burden of high cost unreliable infrastructure and services.
Government departments	Stagnant or erratic but generally too low	Government encourages these but cannot impose them. Some firms more responsive than others – especially those employing more locals in senior roles.	Lack of high level commitment in mining companies. Lack of entrepreneurial drive amongst local firms. Lack of support from donor communities to enable government to boost capacity.	Anti-developmental stance of mining companies. Lack of support from international community.	Mining companies complain about infrastructure but government cannot deliver infrastructure just for them – especially when their revenue contributions are low. Experience is that mining specific infrastructure does not deliver generalised gains.	Government is doing what it can to improve infrastructure within the constraints of the resources it has – there has been progress.
Infrastructure agencies	N/A				Mining companies can in fact cause extra problems in terms of damage to roads.	Lack of finance is the key constraint preventing extension of services and improvements in quality.

Category of respondent	Domestic firm linkages with mining activity	Drivers of linkages	Constraints to linkages	Factors causing constraints	Infrastructure specific constraints to mining companies increasing local sourcing?	Infrastructure specific constraints to local firms (existing & potential suppliers)?
Multi-lateral organisations	Limited but scope for some growth	CSI obligations of mining companies in terms of responding to pressures from policy makers. Some genuine attempt to secure supply chain through a measure of localization.	General business environment – very uncompetitive for local firms. A key element of this is the poor quality and high cost of infrastructure such as electricity. History of limited private sector activity. Government ambivalent about private sector and mining.	Lack of openness in the economy. Poor education and skills framework. High cost of business environment.	High upfront mine establishment costs (driven by having to cover own infrastructure) means mining companies stick to what they know in early operations.	Infrastructure issues are dominant in doing business and investment climate surveys but also other P. sector reforms needed.
Experts	Limited but scope for some growth	CSI.	Mining sector relatively new – cluster is only starting to appear (no colonial history or post colonial mining experience at any scale).	Erratic policy environment focused mainly on revenue matters and not other dimensions of mining sector.	Infrastructure is a problem for all firms – less so for gold producers (at present high gold price) as they do not have to move bulk over large distances as a core element of business.	A major issue that affects firms not only trading with one another but also servicing other sectors like the mines.