

# **The Nature and Determinants of Linkages in Emerging Minerals Commodity Sectors: A Case Study of Gold Mining in Tanzania.**

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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.

The MMCP focuses on a diverse range of commodity sectors in a number of African economies, as well as on key infrastructural determinants of effective linkage development. A number of common factors are identified which will increase linkages beneficially and which lend themselves to policy intervention - the role of ownership, the nature and quality of infrastructure, the national system of innovation, spillover of skills to and from the commodities sector, linkages in regional economies and the nature and consistency of policies directed towards the commodities sectors.

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## Abstract

*This is a study of backward linkages in emerging mineral economies in Sub-Saharan Africa as a potential driver of industrial development in the region. The study covers two sub-sectors namely the exploration and production in a case study of Tanzania's large-scale gold mining operations. For data collection, the study used open-ended interviews, semi-structured interviews, observations and reviewed relevant secondary documents. Based on the two case-studies, the study makes the following broad findings: (i) the Tanzanian large-scale gold mining sector is dominated by multinational companies (MNCs), (ii) the MNCs source high critical and high complex goods and services mostly through long established external supply channels. Local content is limited to low critical products, such as food and beverages, (iii) there is virtually no local value-added in imported high critical and high complex goods and services, and (iv) there is higher volume of local content in the exploration sub-sector than in the production sub-sector. The study concludes that linkages are determined by both public and private sector policies. The main public policy problem is government failure to translate and implement long-term macro policy vision (Vision 2025) to sectoral policies (the mining sector policy) with appropriate sanctions and incentives. And the main private policy problem is the external suppliers driven outsourcing strategy.*

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## Executive Summary

The difference between resource-abundant countries that are successful (e.g. Norway) and those that are not (e.g. Nigeria) is how well the political, economic and social structures of the country are managed. Successful resource-abundant countries are characterised by factors that generate sustainable integration of the mineral sector to the rest of the economy. In these economies the natural resources sector give rise to the development of manufacturing and services industry; that is the natural resources sector develops sustainable local linkages. This study is prompted by the gap between the development outcomes of successful resource-abundant countries and their not successful counterparts.

Tanzania the focus of this study is endowed with vast mineral, petroleum and gas deposits as well as diverse flora and fauna. Yet, in spite of this bountiful natural endowment, Tanzania is still one of the poorest countries in the world today, heavily dependent on agriculture and with poorly developed industrial and service sectors. Using the value chain framework approach and focusing on two sub-chains, the exploration and the production sub-chains of the country's large-scale gold mining value chain, the study sought to examine the nature and determinants of linkages in these two sub-chains.

Through interviews with mining firms, exploration firms and exploration departments of mining, government officials, government agencies officials and, industry goods and services suppliers, observations and review of relevant documents the study made the following broad findings; (i) exploration and production(mining) activities are dominated by Multinational Corporations (MNCs), (ii) these MNCs often use utilise long established external suppliers of goods and services, (iii) in both sub-chains highly critical supplies (critical to the buyers) of goods and services are largely imported with virtually no local value addition. Local supplies are limited to low critical supplies such as food and beverages and, (iv) the exploration sub-chain utilises comparatively more local linkages in both anchor firms and suppliers compared to the production sub-chain.

Cognisant of the importance of adequate and appropriate skill, soft and hard infrastructure, the study concludes that the major determinant of linkages in the two sub-chains was the public and private sector policy framework and the willingness and capacity of government to implement policy. Beyond a general commitment to local sourcing, at a micro-level the buying firms have no effective policies to develop and utilise local linkages and are not actively developing local capacity. The firms are taking advantage of liberal trade policies that permit unrestricted importation of goods and services destined for the sector. The implementation of public policy measures formulated to develop and deepen local linkages was identified as the key missing component of the policy framework. The study concludes by suggesting improved translation of Tanzania's grand industrialisation policy, Vision 2025, into specific policies with appropriate sanctions and incentives.

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## 1.0 Introduction

The effects of the September 2008 financial collapse are still felt worldwide. Governments have adopted and are continuing to adopt austerity measures to balance national accounts. Countries like the Republic of Ireland once viewed as an economic success story have had to borrow substantial amounts of money from international financial institutes to stay afloat. Despite numerous gloomy economic growth predictions the mineral commodities sector has recovered remarkably bringing welcome relief to producers. Virtually all commodity prices have appreciated with March 2011 oil prices at over US\$120 per barrel the highest in the post collapse era.

Driven by strong demand in China and India commodity demand is expected to stay strong. For mineral commodity and oil producing developing countries in sub-Saharan African (SSA) and elsewhere, the exploitation of the commodities presents both threats and opportunities to economic development efforts. In many economies, the potential benefits of revenue realised from the exploitation of mineral commodities and oil over many decades have not materialised, with a number of resource-abundant countries failing to utilise realised revenue to the benefit of their citizens. Also these countries have failed to effect mineral sector driven industrialisation and progress from developing countries status to emerging market economies status. This poor outcome referred to as the resource curse is documented by a large body of literature (see Sachs and Warner, 1995, 1997 and 2001; and Stevens, 2003, for examples).

The resource curse literature attributes the outcome of natural resources exploitation to economic and political transmission mechanisms. Under the economic transmission mechanism, the literature distinguishes two economic transmission mechanisms; the macroeconomic and the microeconomic mechanisms. The Dutch Disease where overvalued real exchange rates undermine international competitiveness is an often cited macroeconomic mechanism (see Auty, 2004). The argument that a dominant primary sector based on the extraction of natural resources crowds out investment in other economic sectors and the policy choices to find the right mix between investment and consumption spending is often cited as a microeconomic transmission mechanism (Stevens and Dietsche, 2008).

Political transmission focuses on policy actions and measures countering the various macroeconomic and microeconomic transmission mechanisms as making the difference between countries that benefit from mineral resource exploitation and those that do not. Literature explains the failure to pursue beneficial policies under two broad arguments, the structural and agency-based arguments (ibid). The structural arguments states that poor performance arises when governments use resource revenue to consolidate themselves and conserve 'bad' political regimes undermining the social and cultural changes that facilitate democratic transitions and consolidations elsewhere. For instance, revenue is at times used to pacify powerful constituencies and where conflict arises the revenue is used to employ internal security to control domestic opponents instead of investing in productive and sustainable ventures. Agency-based arguments centre on those who wield political and other forms of power that enable them to determine policies and agendas in a country. Typically in many developing resource-abundant countries politicians, army

personnel or bureaucrats wield this power in varying degrees. The agency argument states that in less successful countries these constituencies take personal advantage of natural resource wealth. They engage in rent seeking, corrupt political and business practices and thus rob their countries of the opportunities that resource revenues could provide (Stevens and Dietsche, 2008).

The upshot of these arguments is that the resource curse is not an inevitable outcome but a case of policy failure. David and Wright (1997) cite the positive outcomes of the United States of America and Cappelen and Mjøset (2009) cite the Norwegian experience in presenting their anti-resources curse arguments. The Making the Most of Commodities Programme (MMCP-see <http://commodities.open.ac.uk>) which frames this Report adopts the view that the economic outcomes of the exploitation of SSA natural resources is dependent on the policy response taken by both private and public sector stakeholders on the *modus operandi* of exploiting these resources. The programme notes a knowledge gap about how these stakeholders have responded to the exploitation of these commodities in SSA.

This research seeks to identify those factors which have a bearing on the outcome to inform policy makers. Using the value chain framework approach (see Kaplinsky and Morris, 2001) the research is conducted through a case study of the nature, extent and determinants of linkages in the gold mining sector of Tanzania, the fourth largest producer of gold in Africa after South Africa, Ghana and Mali. Gold is a very important commodity which survived the September 2008 financial collapse. Firm current and projected growth in gold prices is premised on two demand sources. First there is strong demand from China and India for gold as jewellery, store of value and industrial use. Second, gold has begun to resume its historic role as a reserve currency. This preference is driven by the weakness and volatility of major currencies such as the United States of America's dollar (US Dollar) and the Euro, which is driving investors and countries to shift their reserve storages from the volatile hard currencies to the stable and appreciating gold to maintain value. This shift in reserves has given rise to a renewed 'gold boom' resulting in increased activity in the gold mining sector. Priced at a US\$ 1 400 per ounce<sup>1</sup> gold prices are historical the highest at least in nominal terms. For Tanzania, a country with an estimated 2% of the world's gold reserves the need to make the most of these reserves calls for the identification and understanding of drivers of developing sustainable linkages to the country's gold mining sector now operating in a liberal environment. An understanding of the drivers may be useful in guiding policymakers formulate and implement appropriate policies.

## 2.0 Organization of the report.

The report adopts the following sequence; section 2 provides the contextual background of the global and Tanzanian gold mining sector, identifying the leading producer countries and firms, reviewing and analysing secondary data sources on linkages in gold mining sector globally and in Tanzania specifically. Section 3 outlines the methodological approach the study adopted, section 4 presents the evidence of

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<sup>1</sup> Price as at 1 March 2011. See- [http://silver-and-gold-prices.goldprice.org/2011\\_03\\_01\\_archive.html](http://silver-and-gold-prices.goldprice.org/2011_03_01_archive.html) (Accessed 12 March 2011)



the nature and extent of linkages in Tanzania and section 5 discusses the influence of the six MMCP issues on the nature and extent of the linkages. The section also discusses policy as the major driver of the extent and nature of the identified linkages. Finally section 6 summarizes the key conclusions, implications of the study and makes recommendations for future studies.

### 3.0 Gold production

Historically gold production has been dominated by a few countries namely South Africa, the United States of America (USA), Canada, Australia and the former Union of Soviet Socialist Republics (USSR). South Africa has been the leading producer of gold. At peak the country accounted for almost 60% of the world's mine production<sup>2</sup>. Declining and deeper deposits have seen South Africa lose its dominance to be the third largest gold producer in world as at December 2009. South Africa's declining fortunes though the most significant are not isolated. Table 1 give the top eight gold producing countries. The table indicates that production from the USA and Australia has been declining as well.

**Table 1: Gold production ranking 2000-2010**

2000			Country	Production in tonnes			Ranking as at 11 May 2010
Country	Production in tonnes	Ranking		2007	2008	2009	
South Africa	427	1	China	276	285	300	1
U.S.A.	353	2	Australia	246	220	215	2
Australia	296	3	South Africa	254	213	215	3
China	172	4	U.S.A.	238	210	215	4
Canada	154	5	Russia	145	176	185	5
Russia	142	6	Peru	170	180	180	6
Peru	134	7	Canada	101	90	95	7
Indonesia	124	8	Indonesia	118	60	100	8

Source: compiled from Chaize, 2010 and Goldsheet Mining directory<sup>3</sup>

Outside the top eight is a group of about 90 smaller countries with production below 100 tonnes of gold per annum. Each of these countries has at least one mine that produces gold. Together the 90 countries produce over half of the production of the top 8 gold producing countries. Chaize (2009) lists the most important in this group as: Argentina, Bolivia, Brazil, Chile, Colombia, Ghana Kazakhstan, Mali, Morocco, Mexico, Papua, Philippines and Tanzania. The countries have cushioned declining global production from the traditional producers. Commentator (see-GFSM, 2002) argues that global production decline could have been worse without the collective production from these countries. Global gold production is dominated by a few firms. Table 2 gives the top ten (globally) gold mining firms based on market capitalization.

**Table 2: Top ten gold mining firms (ranked by market capitalization as at October 2010).**

Firm	Headquarters	No. of mine and location of operations	Market capitalisation US\$
Barrick Gold Corporation	Toronto, Canada	27, Dominican Republic, USA, Peru, Chile, Argentina, Australia, Papua	34.5

<sup>2</sup>See-<http://www.goldsheetlinks.com/production.htm> (accessed September, 2010)

<sup>3</sup>See- <http://www.goldsheetlinks.com/production.htm> (accessed September, 2010)

		New Guinea and Tanzania	
Gold Corp Inc	Vancouver, Canada	12, Argentina, Honduras, Guatemala, Mexico, USA and Canada	31
Newmont Mining	Denver Colorado, USA	11, Ghana, Indonesia, New Zealand Australia, Mexico, USA, Canada and Peru	22.8
Kinross Gold Corp	Toronto, Canada	8, Chile, Brazil, USA and Russia	16
AngloGold Ashanti	Johannesburg, South Africa	21, South Africa, Namibia, Tanzania, Guinea (Republic), Ghana, Australia, Brazil, Argentina and USA	16
Agnico-Eagle Mine Limited	Toronto, Canada	5, Canada, Mexico and Finland	11.5
Gold Fields Inc	Johannesburg, South Africa	9, Ghana, South Africa and Peru	10.3
Compania de Minas Buenaventura	Peru	7, Peru	9.8
Yamana Gold Inc	Toronto, Canada	7, Argentina, Chile and Brazil	8.8
Lihir Gold	Papua New Guinea	4, Papua New Guinea, Côte d'Ivoire and Australia	7.1

Source: Money Energy, 2010. (see-<http://www.getmoneyenergy.com/2009/10/top-largest-global-gold-stocks/> accessed 30 October 2010).

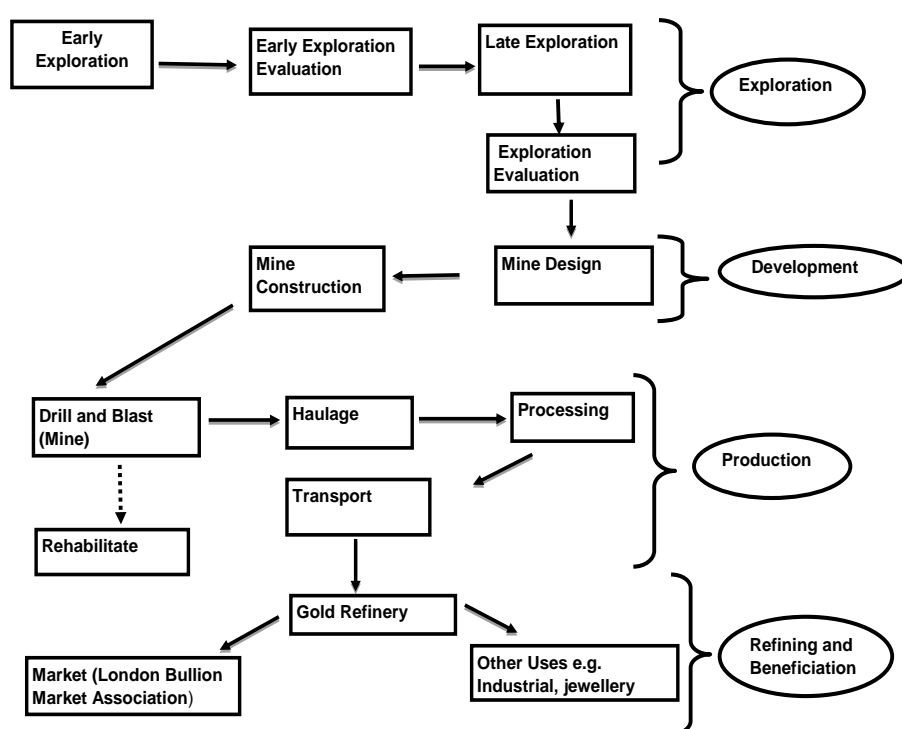
Canadian firms make up 50% of the top ten firms. Other notable big firms are from the USA (Newmont Mining) and South Africa (AngloGold Ashanti and Goldfields). A typical feature of the big firms is that they have global mining operations in both the developed and developing world. For instance AngloGold Ashanti, a major global gold company has mining operations on four continents Africa, North and South America and Australia including gold exploration interests being pursued on these continents.<sup>4</sup>

Two of the top ten gold producing firms, Barrick Gold operating as African Barrick Gold (ABG) and AngloGold Ashanti have operations in Tanzania.

### 3.1 The gold mining value chain

The process of finding, extracting, processing and marketing gold is embedded in a stream of activities comprising of suppliers of products and services at each stage. These interactions between the main and supporting actors at each stage of the gold mining industry make up the gold mining value chain. Figure 1 is a simplified presentation of the global gold mining value chain.

<sup>4</sup> See- <http://www.anglogold.co.za/About%20our%20business> (accessed 19 November, 2010).



**Figure 1: The global gold mining value chain**

Source: This figure was developed by the author based on interviews with exploration firms in Tanzania (Interviews 2010) and MBendi Information services.<sup>5</sup>

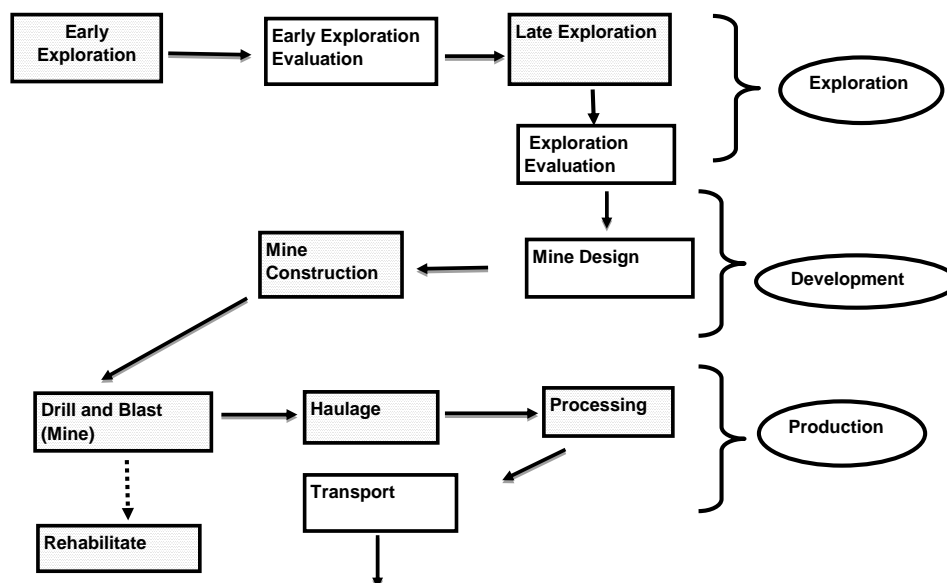
The value chain is divided into four broad sections namely; (i) the exploration section dealing with locating and proving a deposit, (ii) the mine development section dealing with the construction of a mine to access a proven reserve, (iii) the production section dealing with the extraction the mineral from the ore body and processing the ore and refining and, (iv) beneficiation section concerned with the production of pure gold bars, coins, medals, jewellery, electronics and dental industries. Generally firms commonly referred to as mining firms<sup>6</sup> participate directly or indirectly in the first two sub-chains exploration and production (mining).

The Tanzanian gold mining value chain excludes the refining and beneficiation sub-chain (Figure 2). There are no beneficiation firms in Tanzania. Output from the country's gold mining sector is refined and beneficiated in South Africa, Japan and Switzerland.

In the figure all the shaded linkages are entirely resident in Tanzania and those not shaded are largely resident out of Tanzania with only small components resident in Tanzania. The details of the local activities are given below.

<sup>5</sup> See- <http://www.mbendi.com/indy/ming/p0010.htm> (Accessed 10 November 2009)

<sup>6</sup> Firms like Gold Corp, De Beers, BHP and Newmont



**Figure 2: The Tanzanian gold mining value chain**

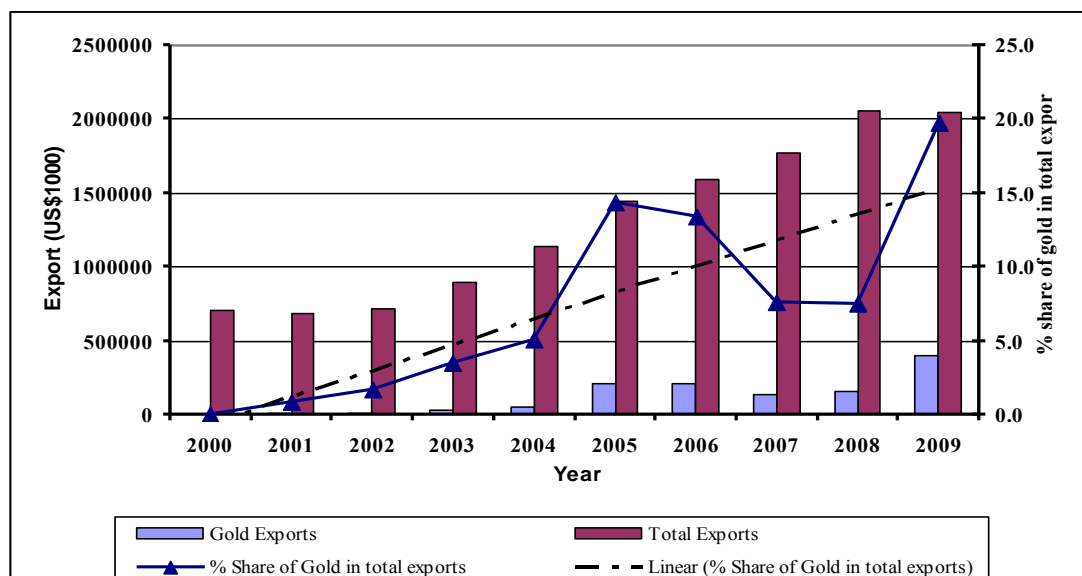
Source: This figure is based on interviews with mining and exploration firms in Tanzania (Interviews 2010) and MBendi Information services.

### 3.2 Gold in Tanzania

The gold mining industry of Tanzania is a multi-billion dollar industry in which various participants contribute machinery, materials and/or services in each linkage.

In recent years the gold mining industry has played a crucial role in the economy of Tanzania. Gold has emerged as the country's leading foreign exchange earner with Saudi Arabia buying 99% of the country's gold output. Earnings from gold exports have grown from negligible levels to a level where in 2009 gold accounted for 20% of the country's US\$4 billion export earnings as indicated in Figure 3.

In addition to earning foreign exchange the industry also contributes to government revenues through paying royalties and other taxes such as pay as you earn (PAYE), corporation tax, employment levies, stamp duties export and import duties amongst others from mining firms and firms supplying goods and services to these firms. In addition the gold mining industry has provided direct employment to the citizens of Tanzania. As at December 2008, Tanzanian citizens made up 89% of the direct total workforce in the country's large scale gold mining industry.



**Figure 3: Exports of gold (\$m) and gold as a share of total exports (%)**

Source: World Economic Indicators (2010)

Three foreign multinational firms dominate large-scale gold production in the country. First there is African Barrick Gold (ABG) which operates four mines Bulyanhulu Gold Mine, Tulawaka Gold Mine, North Mara Gold Mine and Buzwagi Mine. Second there is AngloGold Ashanti, a firm formed by a merger of Ashanti Gold Fields Company (AGFC) of Ghana and AngloGold of South Africa, which owns and operates the Geita Gold Mine (GGM). Third there is Resolute Tanzania Limited (RTL) which is owned by Resolute Limited of Australia. RTL owns and operates the Golden Pride Mine.

Access to the country's mineral resources is governed by terms in the Mining Act, 1998<sup>7</sup>. The Act, which is premised on the Mineral Policy, 1997, replaced the 1979 Act effectively ending the exclusive state access to the country's mineral wealth as part of wider economic reforms (SID, 2009). The Act opened the industry to local and private sector players but also made provisions that allow for the co-existence of local and foreign players. One of the major features of the Act is the distinction it makes between firms wholly owned by citizens of Tanzania and firms with foreign shareholding. Division D of the Act specifies provisions for Tanzanian citizens or firms **owned exclusively** [emphasis added] by Tanzanian citizens in accessing mining rights. The Act exclusively grants primary licences such as Primary Prospecting Licences (PPL) and Primary Mining Licences (PML) to this group. A provision in Division D of the Act makes no gradation on the extent of local ownership. A one percent foreign ownership excludes players from applying for primary licences. The regulations are unusual in this regard. Indications are that the majority of countries that favour local ownership of projects recognise varying degrees of local equity. For instance, Zimbabwe, a country considered to have adopted extreme measures to give its citizens equity in mining ventures, is targeting a 51% stake for its citizen in projects worth more than \$500,000 (Sunday Times, 2011). Firms with foreign shareholding have access to four types of mineral rights: (i) prospecting licence, (ii) prospecting licence reconnaissance, (iii) mining licences and,

<sup>7</sup> This research was carried out when Tanzania was working on amending both the mineral Acts and Policy. Parliament passed the Mineral Act in April 2010.

(iv) Special Mining Licences (SML), as specified in Divisions A and B supported by provisions in Division C. These players largely comprise of large-scale multinational. The major difference provision in Divisions A and D is that Division A provisions call for proof of both technical and financial capacity and capabilities to carry out the specific licence terms. Provisions in Division D do not make similarly demands thus lowering the entry barriers to local firms. To facilitate joint operations between local players and MNCs the Act allows for the conversion of primary licences into licences specified under Division A. For instance, a primary mining licence can be converted into a Mining Licence or Special Mining Licence (SML) if its holder enters into a joint venture with a foreign firm.

Most important and controversially, Section 10 of the Act has provisions that allow the Minister of Minerals and Energy to negotiate and give special SML holders preferences such as tax exemptions and environmental impact assessment exemptions privately and without being restricted by other legal requirements. These agreements called mining development agreements (MDAs) without being restricted by other legal requirements are aimed at ensuring the fiscal stability of a long-term mining projects. An MDA is negotiated and granted in addition to other incentives such as depreciation allowances of 100 per cent, repatriation of capital and profit directly related to mining, non-mandatory government participation and exemption of import duty and Value Added tax (VAT) on equipment and essential materials up to the anniversary of start of production that the Act specifies.

## **4.0 Research questions and methodology**

Large-scale gold mining in Tanzania has grown at a rate of about one new mine every two years since 1998. The most recent, Buzwagi Mine began production in late 2009. This growth rate indicates confidence that mining firms have in the country. For goods and services suppliers the growth of the sector has seen an expanding potential market for their supplies. However concerns have been raised that the sector is operating as an enclave. For the local economy the major question has been how to develop sustainable linkages in the sector and displace some of the imported goods and services. For the local economy to integrate into the sector the study sought to identify the factors that determine integrating into the country's gold mining sector asking the question:

***What is the nature and determinants of linkages in the gold mining sector in Tanzania?***

### **4.1 Scope of study**

Restricted to the exploration and the production sections of the value chain the study was carried out as a case study. Robert Yin (2009) provides a technical definition of a case study inquiry as having the following components; (i) copes with the technically distinctive situation in which there will be many more variables of interest than data points, (ii) relies on multiple sources of evidence, with data needing to converge in a triangulation fashion, and (iii) benefits from the prior development of theoretical proposition to guide data collection and analysis.

The mine construction section was excluded because informants declined to inform

the study. In addition the section is a transitory linkage only available in the country when there is mine under construction. It is a domain of a few global firms that only take residence in a country to fulfil a contract. The refining and beneficiation linkages are also not resident in Tanzania. Access to other refineries outside South Africa was constrained by travelling and time limits on the study.

Guided by the Making The Most Of Commodities Programme (MMCP, see-<http://commodities.open.ac.uk>) hypothesises that the nature and extent of linkages is a function of six explanatory issues namely; (i) ownership, (ii) infrastructure, (iii) the national systems of innovation (NSI), (iv) skills spill over, (v) impact of regional economies and (iv) policy, the study posed the following sub-questions;

- (i) What is extent and what are the determinants of local linkages in the exploration and production linkages of gold mining value chain in Tanzania?
- (ii) What role does ownership in general, and the derived organisation of the 'Purchasing Function' in particular, play in determining linkages in the Tanzanian gold mining industry?
- (iii) What is the impact of physical infrastructure on the role that the local economy plays in the country's gold mining industry?
- (iv) What roles does the Tanzanian NSI play on increasing local linkages in the country's gold mining industry?
- (v) What is the impact of skills availability on local linkages and what is the spillover effect of skills transfer from the gold mining industry on other productive sectors of the economy?
- (vi) What roles do firms in the East African Community (EAC) and Southern African Development Community (SADC) countries play in the Tanzanian gold mining value chain?
- (vii) How does institutional support and policy facilitate or constrain the participation of local the economy in developing linkages?

## **4.2 Data collection and sample**

The depth and extent of pursuing these seven issues to address the main question was determined by two factors; access to informants and the time limits to conduct the research of the research. As a result the study was restricted Tanzania the case study country, the location of gold mines of interest and to South Africa, a regional mining hub with head offices of critical mining firms' staff, mining goods manufactures and mining services providers.

The main informants of the study were in three groups; (i) the mining and exploration firms, (ii) the goods and services providers and (iii) the Government of Tanzania (GoT) targeting three ministries; the MEM, the Ministry of Trade, Industry and Marketing (MTIM) and the Ministry of Infrastructure Development (MID). The selection of the government ministry was based on their relevance to developing linkages in the sector. Table 3 gives the population of description respondents informing this study.

**Table 3: Population description and respondents**

Respondent	Population	Accessed	Interviewed
Mine	3	3	7
Explorer	Undefined	3	4
Suppliers	Undefined	8	12
Government	3 targeted	3	5
Government Agencies	6 targeted	3	3
Other	---	3	6
Total	---	23	37

The study gathered both qualitative and quantitative data through interviews and direct observations and document reviews for triangulation (Druckman, 2005 and Silverman, 2006).

### 4.3 Research Challenges

Field research faced three major challenges:

(i) Politics and mining

Primary data was gathered at the peak of debate on the amendment of the Mining Act, 1998 (United Republic of Tanzania [URT], 1998) and the Mineral Policy, of Tanzania, 1997 (URT 1997). During this period the gold mining industry was under media spotlight because of record high gold prices. The local media repeatedly mentioned these historical prices (some print media publications are in the local language Swahili) giving the impression that the large-scale mining firms were making super profits in the context wide spread poverty in the country. Heightened media spotlight on the sector resulted in guarded comments by both private and public sector informants who were particularly reluctant to provide numerical data. In some cases targeted informants declined to be interviewed. In addition some data could not be accessed as some critical mining related data are protected by law.

(ii) Denied Access

A number of targeted private sector firms declined to be interviewed. This was prevalent amongst exploration drilling firms and engineering firms servicing the sector. At the time of gathering primary data Barrick Gold Corporation was undergoing restructuring which gave birth to African Barrick Gold (ABG). The exercise led to redundancies which included a key contact established before travelling to Tanzania. This sudden change adversely limited access to ABG as alternative contacts frequently travelled out of Tanzania as part of restructuring briefings in South Africa. During this transition period access to ABG mines was denied with the firm gate-keepers reporting that they were restructuring and did not have all key personnel in place to accurately respond to the inquiry.

(iii) Locating key informants

In some cases targeted informants could not be located as they were highly mobile and some were not available even after confirmed appointments. This was very common amongst junior exploration firms. A number of these firms were not resident



at their registered addresses. Furthermore in cases where firms were located, access was limited because respondents were often not available in the offices and when located in exploration sites were reluctant to give interviews.

Communication with targeted respondents was made difficult by poor telephone and internet services. Targeted interviewees also frequently switched between the two communication means. For instance a promised telephone response at times would be confirmed through the e-mail resulting in missed appointments when the internet service was interrupted and messages could not be accessed.

## **5.0 Linkages in the mining sector**

A typical mineral value chain consists of a series of stages that starts with exploration and ends at the production of a finished product. Each stage in the chain is designed to increase the grade and economic value of the valuable components of the original ore. A variety of different capital goods, spares, consumables and services are required at each stage to ensure and maintain operational efficiency and productivity. Collectively, the firms that provide these inputs are termed the “inputs cluster” (Walker and Minnitt, 2006). The inputs cluster can be described in terms of four principal sets of linkages or socio-economic stimuli, which after Albert Hirschman cited in Auty (2006) are: (i) backward linkages (the establishment of firms to provide inputs to the export commodity); (ii) forward linkages (the establishment of firms to process the commodity prior to its export); (iii) fiscal linkage (the spending of government taxes levied on the commodity) and, (iv) final demand linkages (the activities set up in response to the local spending of wages and profits by labour and the owners of capital).

Focusing on the determinants of linkages in the mineral sector, this section proceeds by giving a synopsis of the determinants of linkages in the global gold mining value chain and also partly reviews the same determinants in Tanzania.

### **5.1 Global linkages and determinants of linkages.**

A mine can only exist in a location where there is a mineral deposit. Geological related mineral deposits often exist in clusters of similar deposits in a locality leading to observed phenomenon of mining regions when these deposits are exploited. Example of mining regions include the copper belt in Zambia, the gold green stone belt in Tanzania, Johannesburg (the Rand) in South Africa famous for its gold and diamonds and iron-ore mining Kiruna region of northern Sweden (Eggert, 2001).

Analysis of the history of mining regions indicates that the mere existence of an economically exploitable deposit is not sufficient reason to exploit a deposit. Work by Isard et al. (1998); Krugman (1991) and Eggert (2001) amongst others indicate that the location of a business venture such as mining is a function of the available infrastructure (roads, water and electricity), agglomeration economies (the input industry) and government (central, regional and local government) policy. Mining firms evaluate the viability of exploiting proven reserves by considering *ex ante* these and other factors. Beginning with costs, mines thus must consider the upfront cost of exploration or buying a proven exploitable reserve from a junior explorer and the upfront cost of mine design and construction, the purchase of capital equipment (CAPEX); operational costs (maintenance and consumable etc.), development of

new reserves and the cost of closure. In addition to these exploration and mining firms consider the cost of accessing goods and services necessary for their operations. In some economies the demand for goods and services spur the development of industry to supply the goods and services directly to the mining sector (Eggert, 2001). Where successful and sustainable, these industries may have positive multiplier effects and spillovers leading the development of other industries and capabilities. But these costs need to be balanced against the sale of the final product. For the mine to be a profitable venture, it is not just the sale and the price of the product which is important, but also how long it will take for the mine to become productive. A long gestation period may involve such high borrowing costs that it outweighs the value of the final sale of the output, even though a high price may seem attractive to a casual observer (and sometime to a policymaker too!).

One of the examples of documented development outcomes that were mineral driven is the economic development of the Western Australia and the state of Victoria also in Australia. Researchers argue that the two states owe part of their economic development outcome to the gold mining activities in the states. The two states have developed mining backward and forward linkages and boosted the development of other industries such as communication, manufacturing, transport and agriculture (Eggert, 2001). Drawing on the experience of Australia and South African where the clustering and development of backward linkages rode the wave of gold mining booms, it is evident that a significant determinant of developing linkages is a stable level of demand for goods and services (Walker, 2005). Porter (1990) also argues that international demand coupled with a demanding local customer base, can provide the foundation upon which a competitive supplier base is established. The basis of the argument is that demand is shaped by developments at both the international and national level. Most importantly the sustainable backward linkages developed by these countries were not generally based on the import substitution industrialization policies which often relied on rigid protection mechanisms such as guaranteed quotas, exchange controls and overvalued exchange rates (Eggert, 2001). The linkages were based on sustainability and competitiveness in an open market. Governments often played a role in developing local linkages through developing local capacities and capabilities including encouraging local purchases. For instance in Norway the state-owned company Statoil Oil Company founded in 1972, played a crucial role in transforming parts of Norwegian manufacturing industry into an engineering industry with specialist skills in the production of deep-sea oil drilling equipment, platforms, pipelines and supply ships (Cappelen and Mjøset, 2009).

Experience from countries that have successfully developed sustainable linkages and spillovers in the resource sector shows two other determinants; systems of innovation measured by absorptive capacities, learning, technology transfer and diffusion, and industrial policy. For instance Wright and Czelusta (2002), point out that in the USA the mineral sector was an integral part of the broader process of national development. They point out that the rise of the American minerals economy was also determined by the country's investment in the infrastructure of public knowledge and specifically education in mining, minerals, and metallurgy in an accommodating legal environment. In South Africa the isolation of the country prior to independence in 1994 and the need to deal with deep gold deposits led to the development of distinct and appropriate cooling and drilling technologies. A major

determinant of this development like in the case of the USA was research and development led by the research arm of the Chamber of Mines, COMRO (Lorentzen, 2005).

However, the majority of research has focused on macro determinants of developing linkages. Literature on the micro determinants on developing linkages is very thin. Literature that has attempted to do this instead indicates growth of local linkages but does not discuss the firm-level determinants of these linkages in depth. For instance Aragòn and Rud (2009) discussing the impact of the Yanacocha gold mine in Peru point-out the increasing level of local participation in the mine's supplies as driven by a change in mine's purchasing policy but do not mention the micro issues that determine who amongst the local is selected as a supplier of tangibles and services and why. They however do mention that the supplied services have to meet the mining firm's standards which they do not discuss.

In Tanzania research to date indicates the mining sector has not triggered any significant growth in the local economy, partly because large-scale mining operations are generally detached from local supply chains (Kweka, 2009). The mining firms however argue otherwise, stating that where capacity and capability are available, they do utilise local linkages. In a response to a report titled '*A Golden Opportunity? How Tanzania is failing to benefit from gold mining*' (Curtis and Lissu, 2008), the mining firms refuted the authors' claims of the industry not purchasing local service and tangibles where available. In the report ABG claims that in 2005 'at least 55 per cent' of its procurement was done locally (Tanzania as a whole). In same report the former Chief Executive of Geita Gold Mine, Peter Turner is quoted stating that in 2006 that GGM spent 46 per cent of its annual budget on local supplies and 54 per cent on foreign supplies. Neither of these responses however open up the extent of domestic value added in these local purchases.

This work is an attempt to document the nature, extent and determinants of the said linkages by focusing on a combination of macro- and especially micro-level decisions which affect the nature and extent of linkages into the Tanzanian gold mining sector.

## **5.2 The nature and extent of linkages**

Integration into the gold mining value chain can be a lucrative and sustainable economic activity that is subject to basic economic principles, which measure economic success in terms of revenues and related expenditures.

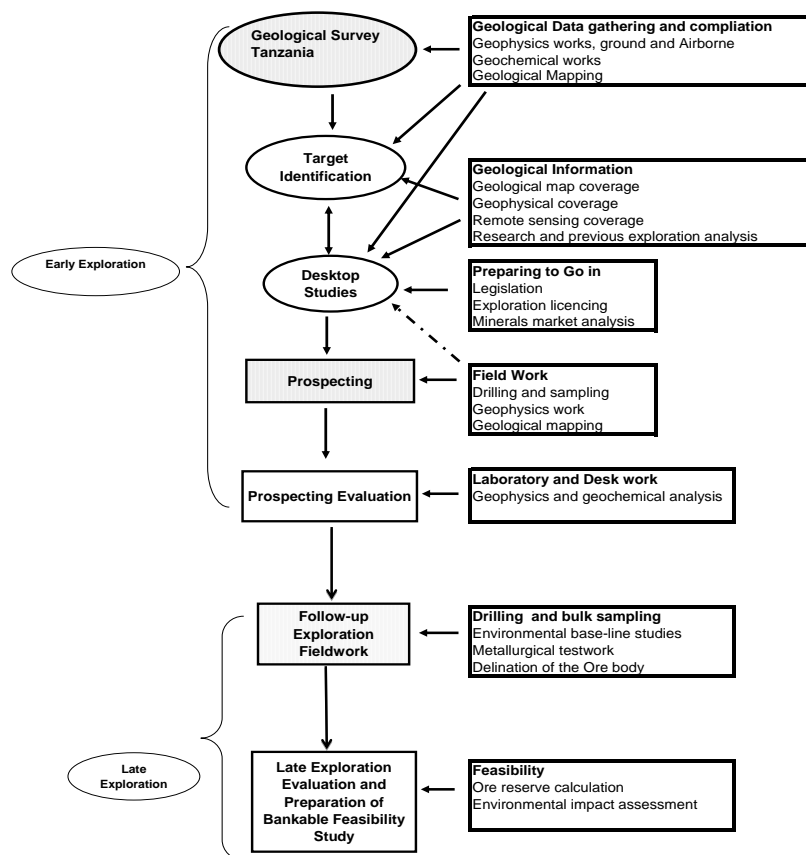
This section examines in detail the nature, extent and determinants of linkages in the two sub-sections of the gold mining value chain in Tanzania. The first section examines the exploration sub-section; the second section focuses on the production sub-section and the third and final compares the two sub-sections.

## **5.3 Exploration**

Exploration is a risky and lengthy process that comprises various activities and inputs from different specialized actors working and focused on ensuring a positive outcome within an economic time frame.

Exploration is a sequential process that generally involves two activities; gathering data and thereafter analyzing and evaluating the data. Proceeding between stages is governed by stage-gates that ensure the process only proceeds if evaluations and analysis show typical indications of a deposit. The stage-gates are very critical as they minimize the risk of pursuing projects that will not yield positive outcomes of a viable deposit.

Figure 4 represents the gold exploration value chain in Tanzania. The exploration linkages reside both inside (shaded) and outside (not shaded) Tanzania. Exploration is divided into two stages; early stage exploration and late stage exploration. The process gathers two types of data; (i) geochemical data which involves collecting samples and analyzing soil, rocks and segments from the surface and drill holes at different depths and (ii) geophysical data which comprises of data on variations in gravity, magnetism, electromagnetism (resistivity of rocks) and other variables in a certain area. Geophysical data is gathered both from the ground and airborne using appropriately equipped aeroplanes. The gathered data is analyzed and interpreted to inform the likelihood and quality of a deposit in the area of concern.



**Figure 4: The Tanzanian Gold Exploration Value Chain**

Source: This figure is based on interviews with an exploration firm and exploration departments of mining firms (Interviews 2009) and Mbendi, 2009.

Gold exploration in Tanzania is anchored by the government and the private sector. The two anchors have two distinct roles. First, the government's role is to regulate the industry by granting appropriate exploration licences, collecting the relevant fees and revenues. Most importantly, the government through its executive agency the

Geological Survey of Tanzania (GST)<sup>8</sup> is the source of geological data that initiate exploration.

Second, there is the private sector which buys the geological data and carries out exploration projects. Private sector players comprise junior explorers, intermediate explorers and major explorers, the mining houses with Greenfield exploration capacity. The Mining Act of Tanzania, 1998 changed the exploration scene in Tanzania by allowing both domestic and foreign private enterprises to compete with the two previously exclusive players the National Development Corporation (NDC) and the State Mining Company (STAMICO) both State Owned Enterprises (SOEs) (Nord et al, 2006 and SID, 2009).

Table 4 shows a sample of junior explorers and intermediate active in Tanzania's gold exploration efforts.

**Table 4: Identified gold exploration firms active in Tanzania.**

Firm	Headquarters	Ownership structure (shares)		Service scope	Works location in Tanzania
Canaco Resources	Canada	0	100	Junior explorer	Magambazi
Zari Exploration	Tanzania	Majority	Minority	Junior explorer	Imweru and Lupa
Curries Rose Resources	Canada	0	100	Junior gold explorer	Susi River and Mabele Hills
Shanta Gold	Guernsey	0	100	Gold exploration and development	Lupa gold field, Mgusu and Singida
Kibo Mining plc	Republic of Ireland	0	100	Gold and Nickel deposit exploration and development	Itetemia, Luhala and Morogoro
Helio Resources Corporation	Canada	0	100	Junior gold explorer	Saza and Makongolisi
Sub-Saharan Resources N.L.	Australia	0	100	Mineral exploration and development	Nyanzaga
Macquarie Harbour Mining Limited	Australia	0	100	Mineral exploration	Miyabi and Igurubi
African Eagle Resources Corp	United Kingdom	0	100	Mineral exploration and development	Miyabi
Peak Resources	Australia	0	100	Mineral exploration and development	Imweru
MDN Exploration	Canada	0	100	Gold and base metal Exploration and development	Ikungu, Isambara, Mnekezi, Vinyoza and Msasa projects
Tan-Zoz Exploration	Tanzania	Majority	Minority	Junior explorer	Not indicated
Gold Finders	Tanzania	100	0	Junior explorer	Not indicated
Tanzimex	Tanzania	100	0	Junior explorer	Kinyambwiga

Source: This table was developed by the author based on interviews with exploration firms in Tanzania (Interviews 2010).

The table clearly indicates domination of the industry by foreign firms. Amongst foreign junior exploration firms, Canadian firms dominate the industry followed by

<sup>8</sup> [http://www.gst.go.tz/add/about\\_history.html](http://www.gst.go.tz/add/about_history.html) (Accessed September 2010).

Australian firms. Tanzanian domicile firms like Tanzimex Exploration, Gold Finders and Zari Exploration have made inroads into the sector.

The sample in Table 4 exhibits dominance of private sector firm. Participation in exploration is solely dependent on technical and financial capacities and capabilities. It is open to both foreign and domestic private sector enterprises. The share holding structure is the sole prerogative of the explorer but any degree of foreign share holding renders the explorer illegible to accessing primary exploration licences. The government has no stake in these enterprises but engages in exploration through the SOEs STAMICO and NDC. Liberal policies allowing free enterprise are not confined to explorers only but also apply to goods and services providers as given in Tables where these suppliers are discussed below (see- Tables 6, 7, 9 and 10).

In addition to the junior explorers the three large-scale mining firms active in Tanzania have their own Greenfield exploration department or firms. For instance AngloGold Ashanti (AGA) has an exploration branch with head offices in Johannesburg, South Africa. Its exploration team in Tanzania comprises both Tanzanian citizens and expatriate staff as is the case with Resolute (Tanzania) Limited. ABG's exploration interests are handled by Barrick Exploration Africa Limited (BEAL), a wholly owned subsidiary of Barrick Gold Corporation, also active in Burkina Faso, Mali and Guinea

Explorers stated that they retained certain linkages in-house and contracted out others. Activities are either contracted out or retained in-house as shown in Table 5 where X denotes an activity retained and 0 an activity is outsourced.

**Table 5: Outsourced and in-house activities in the Tanzanian gold exploration value chain**

Service/Process	In-house	Outsourced
Target generation	X	0
area selection	X	0
Geophysical work	0	X
Laboratory work	0	X
QAQC	X	0
Drawing up contracts	X	0
Reserve estimation	X	0
Logistics	0	X
Data capture and processing	X	0
Drilling	0	X

Source: This table is based on interviews with exploration firms in Tanzania (Interviews 2010).

The explorers stated that they generally contracted out the physical aspects of exploration such as geophysical and geochemical work like drilling, airborne geophysical surveys, laboratory analysis and the logistic works like camp management. They however retained the quality management function of these contracted services in addition to their core activities of data interpretation.

### 5.3.1 Geochemical works

Geochemical work involves collecting and analyzing samples. Soil, sediments and rocks samples are collected from the surface and underground. Obtaining underground samples involves drilling, a key and most expensive component of mineral exploration activities. An exploration manager of a mining firm confirmed the prominence of drilling in exploration stating;

*“..I can say 90% of the exploration cost is going into drilling. If you have US\$8 million budget you be expecting more than US\$7 million to go into drilling because it is very costly.”* (Interview, February 2010).

Drilling intensity varies across the exploration stages. Generally most drilling takes place during the late stage exploration phase processes of ore-body delineation. Table 6 identifies the gold exploration goods and services providers supporting exploration geochemical works in Tanzania. The Table clearly show the dominance of drilling works suppliers.

**Table 4: Exploration geochemical works good and services providers in Tanzania**

Firm	Head Office	Service scope	Ownership structure (shares)			
			Local	Foreign	Public	Private
GST	Tanzania	Geological mapping, geophysical and geophysical surveys and analysis	100	0	100	0
STAMICO	Tanzania	Drilling (scope and range not ascertained), mineral exploration and property consultancy and Joint Venturing	100	0	100	0
Tan Zoz	Tanzania	Drilling (scope not ascertained)	Majority	Minority	0	100
Gold Finders	Tanzania	Stream sediment, soil and rock chip sampling	100	0	0	100
Capital Drilling	Singapore	Surface diamond core, high air capacity, reverse circular, grade control, heli-portable diamond, deep directional core orientation, air core, geotechnical, coal and coal-bed methane drilling services.	0	100	0	100
Layne Drilling Tanzania (formerly Stanley Mining Services)	Australia	Rotary air blast (RBA), kit bit, reverse circulation, diamond, directional and grade control drilling services.	0	100	0	100
Africa Mining Services (Owned by Ausdrill)	Australia	Reverse circulation, surface diamond, directional, RBA and air core drilling services	0	100	0	100
Major Drilling	Canada	Surface and underground coring, directional, reverse circulation, geotechnical coal and coal-bed methane drilling services	0	100	0	100
SEAMIC	Tanzania	Geological mapping, geochemical and geophysical surveys and analysis	100	0	100	0
ALX Chemex	Australia	Sample preparation and analysis	0	100	0	100
SGS Laboratories	Italy	Sample preparation, analysis and turnkey surveys	0	100	0	100

**Source:** This table is based on interviews with exploration firms in Tanzania (Interviews 2010).

The geochemical works supplies market has also seen changes since the Mining Act, 1998 allowed both local and foreign actors in the scene. Prior to the Act, the State Mining Company (STAMICO) was the sole player. After the Act was enacted, foreign players such as Layne Drilling established operations in Tanzania. In addition locally domicile drilling firms such as Tan-Zorro Drilling have been established.

The personnel carrying out drilling operations comprises both Tanzanian citizens and expatriates. In the absence of detailed data responses from the drilling firms, the study could not ascertain the distribution of skilled, unskilled local and expatriate employees in the drilling firms. Despite the absence of detailed responses, an exploration manager pointed out that the machine operators were largely Tanzanian citizens trained abroad during the Nyerere era. He further stated that in his experience, the operators were capable as they had and both practical and theoretical drilling knowledge but had not had an opportunity to practice with their previous employer STAMICO. The manager remarked;

*'I can tell you they [Tanzanian drillers] were second to none,... because unlike the foreign drillers which I think did not go to any specific form of training, these people[Tanzanian drillers] in the past the government sent them abroad to learn drilling techniques.[meaning they were formally trained abroad]'* (Interview , February, 2010).

All drilling equipment and components used in Tanzania are imported with no local value addition. The maintenance of the machinery is effectively a closed system with the drilling firms dealing directly with machinery and spare manufactures. Two firms with worldwide operations supplying drilling machinery and spares Atlas Copco and Sandvik Mining and Construction both of Sweden have established subsidiaries in Tanzania to service players in the field.

In addition to the drilling geochemical works Tanzania also host laboratories that carry out geochemical assays and also prepare samples for advanced geochemical assays not available locally. Tanzania hosts both private sector and public sector geochemical laboratories. The public sector laboratories (the GST laboratory) engage in sample preparation and a limited range of assaying techniques. The GST laboratory is manned entirely by citizens of Tanzanian and serves its own internal needs of assaying to provide geochemical maps as well as assaying on contract for private sector explorers. In addition there is the Southern and Eastern African Mineral Centre (SEAMIC) laboratory also offering more or less the same services. Economic liberalization resulted in two foreign owned private laboratories; ALX Chemex and SGS laboratories establishing operations in Tanzania. The laboratories carry out sample preparation in Tanzania but send the samples to South Africa and Australia for analysis. Access to the laboratories was however denied.

The study identified an emerging industry of sample container<sup>9</sup> producers. For geochemical work sample containers are critical for carrying samples from the exploration sites to the laboratories. The containers have to be made of inert and durable material that will not react with the samples. In addition the containers have to be durable and not tear and mix samples in transit. Exploration sampling uses a

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<sup>9</sup> Containers to carry rock and soil samples



lot of containers to store sample for laboratory analysis. One firm reported collecting 7 500 samples from one of its more than 30 exploration licensed sites. Currently most containers are imported from South Africa and Australia with local suppliers having only recently entered the stage. Explorers expressed willingness to purchase locally fabricated containers as long as they met the required standards.

### 5.3.2 Geophysical works

Whereas the geochemical linkages indicated a number of local linkages the circumstances in the geophysical linkages indicate very limited local linkages. Table 7 lists firms identified as providers of exploration geophysical work services.

**Table 5: Geophysical work service providers active in Tanzania**

Firm	Head Office	Service scope	Ownership structure share	
			Local	Foreign
Fugro Airborne Survey	South Africa	Airborne geophysical surveys	0	100
Geophysics GPR	Zimbabwe	Ground based geophysical surveys	0	100
Geoimage	Australia	Satellite imagery and geo-spatial solution provider (Quick bird images)	0	100
Jigsaw Geosciences Pty Ltd	Australia	Geological mapping	0	100
UTS Geophysics	Australia	Airborne magnetic surveys	0	100
Gold Finders	Tanzania	Ground magnetometer surveys	100	0

Source: This table is based on interviews with exploration stakeholders in Tanzania (Interviews 2010)

The suppliers listed in Table 7 are all foreign except for Gold Finders a local explorer with limited ground based geophysical work capacity and capabilities. However none of the exploration majors and juniors mentioned using the firm's capacity and capabilities in their own work. Geophysical services providers were largely available from firms of Australian origin complemented by skills and service from South Africa, a regional mining power-house. In addition Zimbabwe, a country with a fairly developed mining expertise base that has been affected by political and economic unrest was mentioned as a source of ground geophysical work services. Geophysical works service providers were not available to inform the study. Foreign firms providing geophysical services to both the public and private sector exploration sub-chain imported in all equipment and spares for their work. The equipment and spare comprises electronic equipment such as cameras not manufactured in Tanzania.

The GST, a public sector enterprise calls on different sources of service providers for its geophysical work. The Acting Commissioner of Minerals in the MEM stated that in the 2003 to 2007 upgrade of geophysical data the GST received technical assistance from agencies such as Federal Institute for Geosciences and Natural Resources (BGR) of Germany, the United Nations Development Programme, UNDP, and the Geological Survey of Finland (GTK) as a contractor assisting the GST<sup>10</sup>. The

<sup>10</sup> See also [http://www.gst.go.tz/add/mapping\\_airborne.html](http://www.gst.go.tz/add/mapping_airborne.html)

agencies are said to have brought in technical expertise and equipment from their own countries to work with and train their Tanzanian counterparts. The suppliers of equipment and subcontractors (if any) used in this upgrading work were not made available.

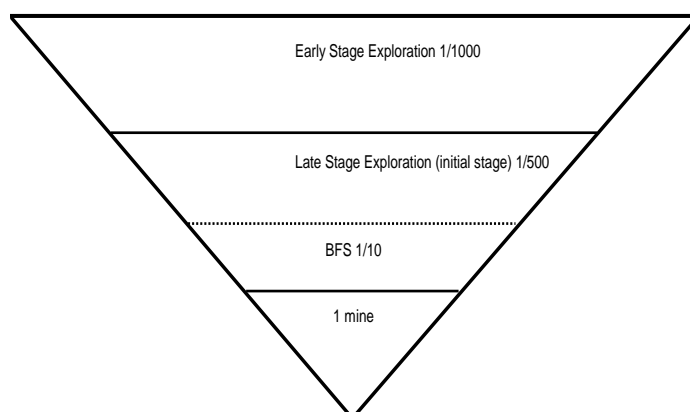
### **5.3.3 Other works**

Exploration occurs in areas where geological data indicates the likelihood of deposits. Often these areas are remote. Accessing and operating from exploration site is usually a logistically demanding exercise. To carry out exploration work, firms need to rapidly and cost effectively move both equipment and personnel to the selected site. Firms have emerged to offer such service leaving explorers to concentrate on their core competencies. The firms provide a number of services such as the clearing access to exploration sites, catering, facilitating the purchase or hire of appropriately equipped all-terrain vehicles, the supply and management of exploration camps. Three major firms; African Mineral Exploration Service, All Terrain Services (ATS) and Sodexho were identified as firms providing these services in Tanzania. African Mineral Exploration Services is a Kenyan registered firm with a management team of Australian origin. ATS is part of the Canadian Mineral Exploration and Company (CME & Company) group operating remote camp catering, hotels, bars and restaurants throughout Africa. ATS offers camp management services to exploration firms. Sodexho on the other hand is a camp management firm of French origin also offering camp management services, like catering and general housekeeping service like laundry.

From 1998 to 2010 a small number of Tanzanian citizens have made attempts to establish similar operations offering logistics services such as all terrain vehicles and clearing access to selected exploration areas. The majority of local firms identified were unregistered 'one-man' operations often reliant on recommendations from locals involved in one way or the other with the exploration the various exploration firms. Indications are that with increased exploration activities in Tanzania, demand for such services will grow providing an opportunity for Tanzanians to establish and register world class firms in the field.

## **5.4 Determinant of linkages; explorers' views**

Explorers emphasized that exploration was a very risky undertaking with a one in a thousand chance of a Greenfield project proceeding from pure desk work such as target selection to prospecting at the early stage exploration phase to the preparation of a bankable feasibility study (BFS) at the end of late stage exploration phase. Spencer (Interview, 2010) summarized the increasing odds of a success in a Greenfield project in an inverted triangle as Figure 5 illustrates.



**Figure 5: The inverted exploration triangle.**

Source: Prepared by author from interviews 2010.

The figure indicates that a Greenfield project even at the final BFS stage still only has a 10 percent chance of developing into a profitable mine and that a project at initial late stage exploration phase (drilling for ore body delineation) has a one in five hundred chance of being a mine. To mitigate risk explorers subject progress on exploration projects to numerous stage-gates to designed control both internal and external variables.

Internally all the respondents mentioned that competent and experienced personnel were critical in ensuring favourable exploration outcomes. They acknowledged that experience came from practice stating that they had specific internal training programmes designed to give experience to newly recruited Tanzanian citizen graduates from the universities and colleges at home and abroad.

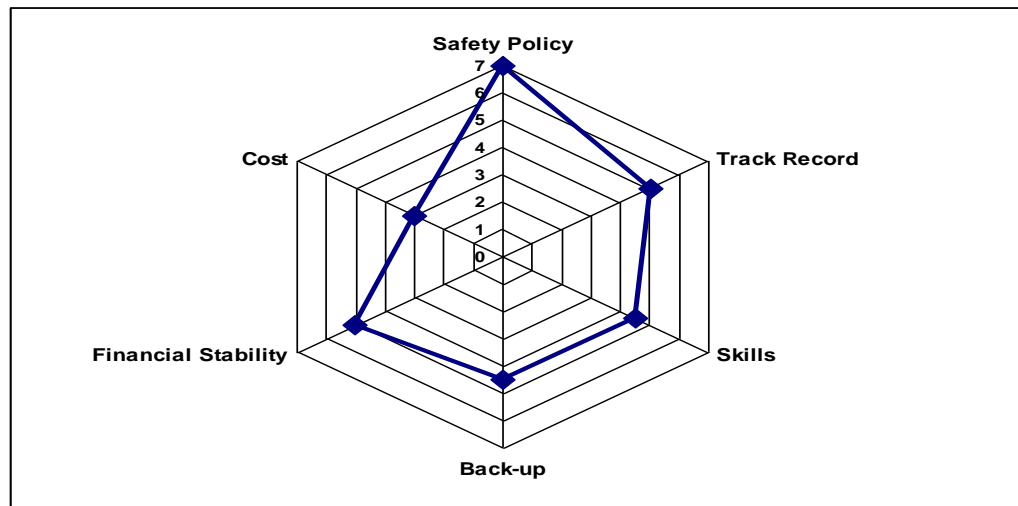
The responding explorers stated that they had set criteria to measure goods and services suppliers. To ensure transparency, the explorers stated that large purchases were subject to tender process and smaller purchases to comparison of a minimum of three quotations. The respondents were asked to identify, define and rank critical success factors (CFS) or order winning' characteristics' (Hill, 2000:39). The respondents mentioned six common CFS as follows; (i) **Safety Policy**, defined as the documented and procedural steps taken to minimize occupational risks; (ii) **Track-record**, defined as a traceable history in supplying specific products and services. An exploration manager emphasized the point of a good track record in Tanzania stating;

*'...we are looking for [we look for] a stable company that already has a foothold into [in] Tanzania...'* (Interview, February 2010).

(iii) **Back-up**, defined as the ability to guarantee goods and services in cases of failure of stated goods and services to meet expectations; (iv) **Skills/capability**, defined as the ability to timely and correctly deliver the required goods and services; (v) **Financial stability**, defined as the ability of a supplier to fund its supplies without resorting to advance payment, and (v) **Cost/price**, defined as the **total cost** [emphasis added] of purchasing goods and services. The emphasis on total cost arises from the nature of drilling services charge that drilling firms. Some service provider firms' charges are inclusive of operating costs such as fuel, lubricants and security of personnel and equipment costs whereas others are not. Therefore

adjudicating cost implications of outsourcing a service involves examining and quantifying the total costs of paying the service provider, including the cost the explorer has to bear in executing that contract.

Explorers were asked to rank these CSF on a scale of one to seven where one was the score of least importance and seven as score of highest importance. The sole responding junior explorer could not be drawn to rank the CSF stating that it was inappropriate to rank them as none of the CSFs were independent enough to be ranked individually. Results from the two responding exploration majors are summarized graphically in Figure 6.



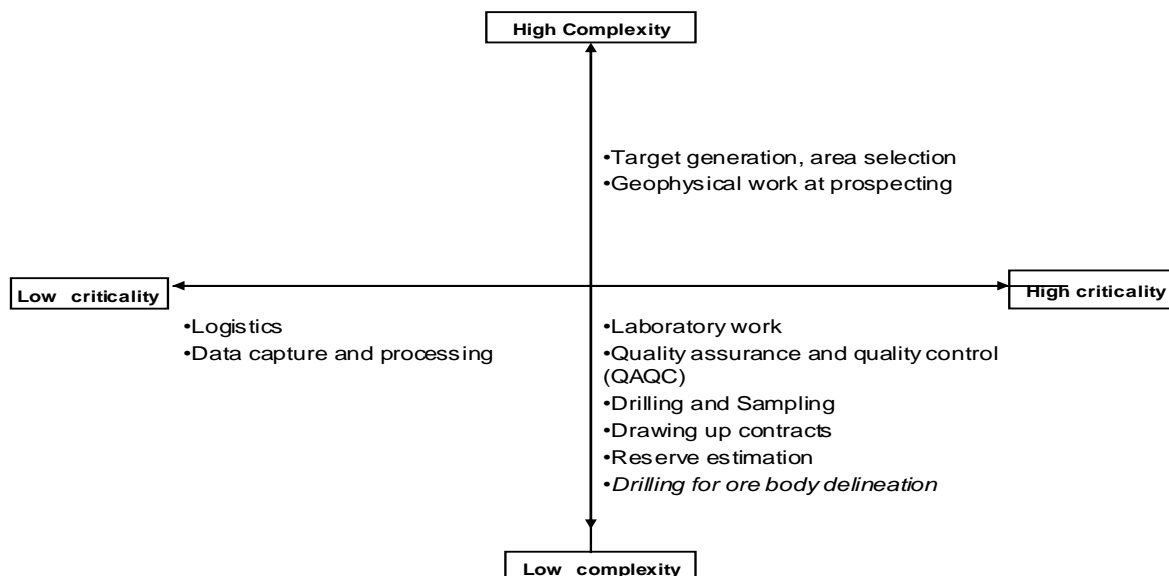
**Figure 6: CFS ranking: Explorer's views**

Source: This figure is based on interviews with exploration stakeholders (Interviews 2010)

The figure indicates that the cost of sourcing goods and services with an average score of two points was the lowest ranked CSF. The safety policy was considered the key CSF by both explorers scoring the highest score of seven points. The rest of the CSF scored four to five points. Comparable scores from goods and service providers were not available. Access to the group was denied and where access was granted the location of key informants was not possible as the majority of providers of foreign origin tend to have only operators and technical people in Tanzania. This group could not provide comparable data and were reluctant to inform the study without authorization from their regional and corporate offices.

#### 5.4.1 Classification of Purchases

The skills, processes, services and equipment used in the exploration process vary in many dimensions. The study sought to define these parameters (skills, processes, services and equipment) in two dimensions; complexity and criticality from both the buyers and suppliers view points. Consequently the respondents were asked to rank these in a two-by-two matrix as either lowly or highly critical and as either lowly or highly complex. The results of this inquiry are summarized in Figure 7 overleaf.



**Figure 7: Classification of exploration services and tasks**

Source: This figure is based on interviews with exploration stakeholders (Interviews 2010).

Explorers stated that they could not classify the equipment and machinery used in exploration work because that was beyond their scope. They advanced a view that something they may regard as complex may be viewed as simple from a suppliers view point. However, they classified the various exploration services and activities as follows;

(i) Target generation and area selection<sup>11</sup> were perceived as highly complex and highly critical activities. Inadequacies at target generation and area selection are potentially costly in two aspects.

(ii)

First pursuing exploration on barren ground leads to wasted efforts and money without realizing a productive mine to recover the exploration costs. Second, missing vital geological indicators of a viable deposit may lead to a mine development opportunity that can be seized by more competent explorers. For instance the Buzwagi Mine in Tanzania is regarded to be ABG's most profitable mine, despite numerous major and junior explorers misinterpreting the geological indicators of gold in the area. An exploration manager (then a junior employee in one the firms) who initially saw potential in the site commented;

*'At Company XYZ [junior exploration firm's name withheld] I supervised that project. Before I went there, five foreign companies who had worked there [reconnaissance for area selection] ... They decided to leave because they believed there was nothing.'* (Interview, February 2010).

<sup>11</sup> Target generation is the process of identifying countries or regions whose geology indicates the likelihood of deposits and area selection is the narrowing down the search minerals from target identification to a specific area in a country

The same manager recommended the site to his superiors who however rejected the project. Persistence by the manager and similar views from an external consultant resulted in further exploration work that confirmed viable deposits. The manager further remarked;

*'Even when I was working for company X [major firm name withheld] ... my manager did not accept that this was good ground. I had to defend it and I got back up from one company X's consultant Professor P. from one University in Canada because he is much respected and then they accepted this.'*  
(Interview, February 2010).

Explorers understand the difficulty of target identification and area selection. The firms mitigate this by calling on external expertise. Another example of external influence is illustrated in how Dr. Peter Grove influenced Canaco (an exploration firm active in Tanzania) to purchase the licences for the Magambazi area (Mining News and Journal, 2010).

(iii) The respondents placed laboratory work, quality assurance/quality control (QAQC), drilling, sampling, drawing up contracts and reserve estimation in the low complexity and high criticality quadrant (bottom right quadrant).

Laboratory work, QAQC, drilling and sampling were mentioned as interlinked parameters. QAQC first ensures that drilling and sampling follow laid down procedures that do not lead to false results. False results affect mine design and ore processing techniques choices. As a result firms ensure robust QAQC systems at drilling; sampling and analysis to identify minimize and eliminate errors. Implementing these systems was reported as being a low complex but highly critical process that minimizes the likelihood of false results and interpretations. The calculation of reserves was placed in this quadrant because it is said to follow "*laid down procedures*" but is highly critical as it defines how a mineral site will be rated by developers.

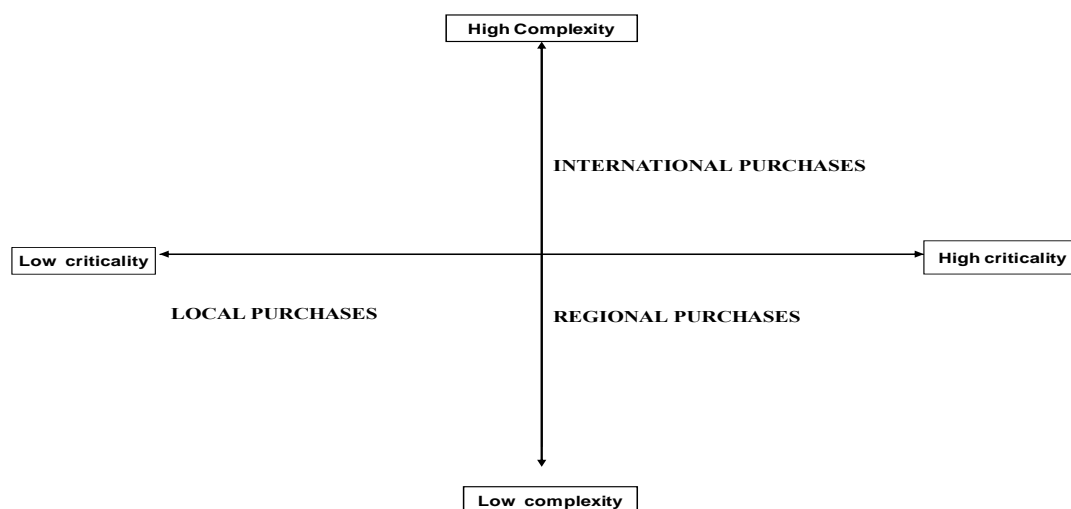
(iv) Under the low complex and low critical quadrant explorers mentioned the provision of logistics such as the provision of transport for goods and personnel, vehicle maintenance, food supply (limited to what is available locally), professional services such as accounting, auditing and immigration services. Also in this quadrant were data capture and processing. This was classified as simple process because the firms believed that they had adequate quality management systems to deal with potential errors.

(v)

None of the respondents could instantly allocate a service or process to the low critical and high complex quadrant. Follow-ups to populate the quadrant were not successful with explorers stating that they did not view an exploration process or service as being lowly critical but highly complex.

An inquiry of the source and origins of service providers corroborated the list of identified goods and services providers. The locations were classified as local, representing suppliers based in Tanzania, regional for suppliers based in the EAC and SADC and the international suppliers based outside Africa. Figure 8 below

shows a graphic representation the dominant<sup>12</sup> geographical location of supplier in the relevant.



**Figure 8: Geographic location of suppliers**

Source: This figure is based on interviews with exploration stakeholders (Interviews 2010)

Generally the services in the high complex and high critical quadrant were sourced from international firms outside Africa (Figure 8). However South Africa a regional mining power house and host of a number international exploration services firms also had a stake in the supply. Regional powers such as South Africa generally dominate the low complexity but high critical quadrants. Some international firms such as drilling firms with locally registered operations have exposed locals to activities in this quadrant. Tanzania citizens provide labour as machine operators.

The explorers stated that in some instances standards and local capacity and capabilities limited local linkages. For instance part of the laboratory work is carried out abroad as the local laboratories lacked adequate facilities for a full range assays. Also some laboratories are not accredited to regulatory bodies such as the Joint Ore Reserves Committee (JORC)<sup>13</sup>. The SEAMIC and GST laboratories for example are not accredited to JORC the major standard dominating the Tanzanian market. In addition the GST laboratory offers a limited range of both geophysical and geochemical analysis. These deficits limit deeper integration of the two laboratories in the exploration sub-chain.

In general goods and services in the low complex and low criticality quadrants were sourced locally. International firms have established Tanzania registered operations to take advantage of these operations. For instance, at the time of the study they

<sup>12</sup> Figure 8 restricts the classification to the dominant suppliers in the relevant quadrant. There are overlaps between the quadrants as supplier move around the locations responding to business demands.

<sup>13</sup> The JORC Code provides minimum standards for public reporting to ensure that investors and their advisers have all the information they would reasonably require for forming a reliable opinion on the results and estimates being reported.

dominated the camp management services suppliers. These suppliers stated that their own local purchases were limited to food and beverages. However, they stated that they import branded foods and almost all manufactured equipment not manufactured in Tanzania.

## 5.5 Production linkages

The primary focus of the production value chain is the safe removal and semi-processing of the mineral resource for refining, beneficiation and sale to recover exploration and construction expenses and to fund the production running costs.

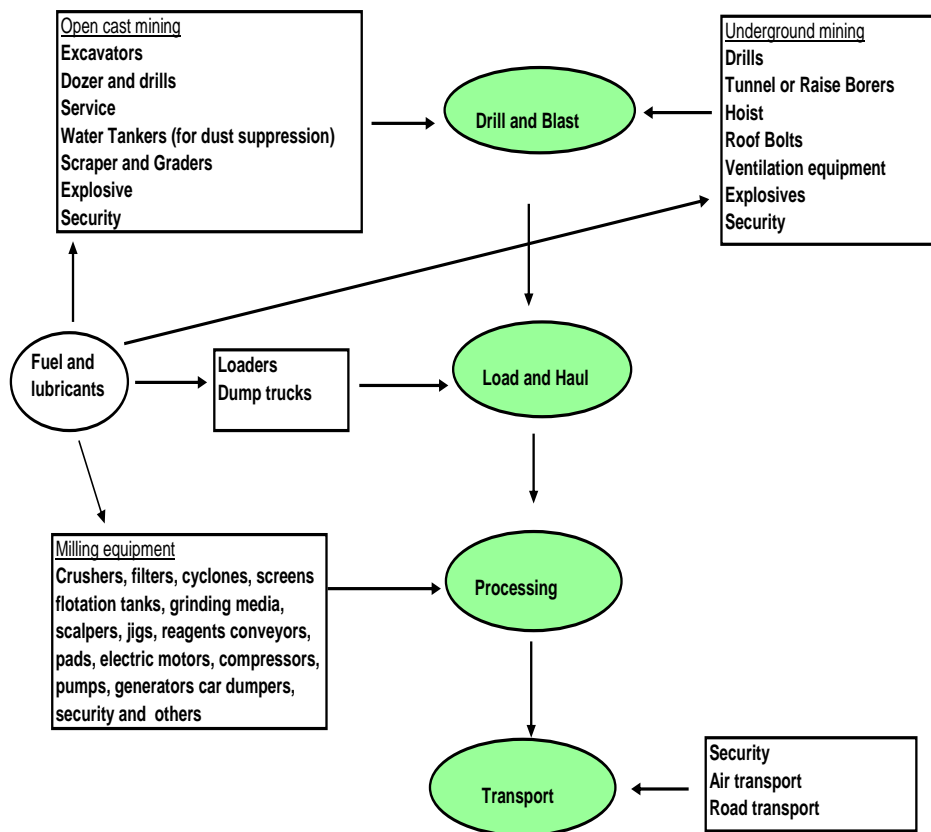
The gold production value chain (Figure 9) comprises four linkages; the drilling and blasting linkage, the loading and haulage linkage, the processing linkage that yields gold dorè (semi-processed ore) and finally the transport linkage that facilitates the movement of gold dorè to the gold refineries.

Gold production, commonly known as mining is a highly sequential process with each linkage solely dependent on the one before it. For instance the loading and hauling process depends on the availability of rock and earth yielded by the drilling and blasting process and the operation of the processing plant also required the output of the loading and hauling of ore bearing rock and earth from the drilling and blasting activities.

The anchors of the value chain are the mining houses ABG, AGA and Resolute Tanzania Limited (RTL). Between them the three mining firms own and operate the six large-scale gold mines that were operational in Tanzania at the time of this study. ABG owned four mines accounting for 60% large-scale production output. AGA owned one mine, GGM account for 30% of output and RTL accounting for the 10% balance of the large-scale output operated the Golden Pride Mine.

The production process generally employs one of two strategies. First a mining firm may choose to be directly and solely involved in all of the sub-chain activities. Second and alternatively, a firm may choose to contract out some or all of the drilling and blasting, the loading and hauling and the transportation of gold dorè linkages retaining the gold ore processing linkage only. Usually firms prefer retaining the ore processing linkage in-house. In Tanzania one mining firm RTL has contracted out its drilling (or excavation), blasting, loading and hauling operations. The firm contracted these linkages to an international firm Caspian mining. ABG indicated it had no preferred *modus operandi* in the in-sourcing or outsourcing of these linkages treating each mine on a case by case basis. The firm was however reluctant to discuss specific cases. AGA also used both internal and external capacities in its GGM operations.





**Figure 9: The production value chain**

Source: This figure was developed by the author based on interviews with exploration firms in Tanzania (Interviews 2010).

Outside the supply of drilling, blasting loading and hauling services, supplies to the production linkages generally fall into two groups; the supply of machinery, spares and consumable used in drilling, blasting loading and hauling and, the supply of spares and consumables used in the processing plant.

### 5.5.1 Drilling, blasting loading and hauling hardware supplies.

In Tanzania the excavation, loading and hauling machinery market is largely a preserve of two original equipment manufacturer (OEM) firms Komatsu and Caterpillar.

Caterpillar operates as Mantrac with local branches in Dar es Salaam, Mwanza, Tanga and Moshi. The firm offers a range of comprehensive repair and maintenance contracts to the mining sector and other sectors as well. The Mwanza workshop services the country's gold mining sectors. Komatsu operates as Pan African Mining Services Tanzania Limited running two maintenance and repair contracts with GGM and the ABG's Buzwagi mine. At the GGM mine the Pan African Mining Services has a supply and service agreement for 56 machines. The firm also services the Buzwagi mine where it is the principal mining equipment supplier with maintenance and repair contract as well. In addition the firm also has contracts at North Mara Gold

Mine (Barrick Gold), Tulawaka Gold Mine. In addition it counts Caspian Mining a Golden Pride Mine (Resolute Tanzania Limited) contract miner as a customer.

Indications in Tanzania are that where mining firms opt to retain the drilling, blasting, loading and hauling function in-house, capital goods supply is almost entirely on supply and service contracts. The contracts usually last the lifespan of the mine. The respondents stated that the mining houses preferred such arrangements to mitigate the risk of technological failures and redundancies, and the overhead costs of maintaining the machinery in-house. An operations manager commented;

*'These supply and service contracts puts the pressure of making sure the machinery is well serviced and always available on the supplier.... even if the technology changes we are covered [suppliers are contractually bound to supply the correct components and spares all the time].'* (Interview, March 2010).

Drilling machinery is largely supplied by Sandvik Mining and Construction of Sweden but with offices in Tanzania. There is virtually no local value addition in these supplies. The heavy drilling (or excavation), loading and hauling equipment and the processing plant demand a number of consumables. As a result consumable linkages have developed to fulfil this demand.

### **5.5.2 Drilling, blasting loading and hauling consumables.**

Consumables in the drilling, blasting, loading and hauling linkages comprise petroleum fuel, lubricants, explosives and machinery wear and tear spares.

Liquid petroleum fuel is a leading consumable in the two linkages. The fuel powers the drilling, loading and haulage machinery. The procurement managers in all the three mining firms stated that petroleum products were the most costly (financially) inputs of the production sub-chain. Fuel expenses are high because the drilling, excavating, loading and hauling machinery is heavy and thus consumes vast amounts of petroleum based fuel. Mining operations are continuous making daily fuel consumption high. A group procurement manager illustrating the point stated;

*'If you think about your Caterpillar truck,... .. your average fuel consumption [during typical mining operations] is about between 95 litres to 100litres per hour and you can work it out if you have 30 trucks, 24 hours a day , 360 days a year.. ..... that excludes the loaders.'* (Interview, November 2009).

Also included under the fuel expenses label are petroleum based lubricants which are supplied by fuel suppliers. Tanzania hosts a number of global major petroleum firms like BP, Shell and Oryx Petroleum. These international firms have depots in Tanzania but do not have processing plants. Value addition in Tanzania comprises of packaging lubricants into manageable containers (breaking imported bulk).

The mining firms stated that fuel purchases were best negotiated from head office as supply contracts often covered their entire global operations. The firms argued that centralized negotiations gave them direct access to the petroleum firms availing competitive prices that would not be possible if negotiations for supply contracts were decentralized.

## 5.6 The processing plant

The processing plant hardware is erected at the mine construction sub-chain. The hardware is designed to last the entire production life cycle. During operations the plant consumes spares for ancillary machinery and consumables as well. The study sought to identify the suppliers of ancillary machinery spares and consumables and to document how the suppliers have changed over time. In addition it sought to identify any domestic value addition. Only one of the three mining house responded. Tables 8 and 9 summarise this response.

The Tables indicate that the majority of suppliers are from Australia and South Africa. The two countries have established mining processing plant spares, components and consumables manufacturing capacity and capabilities. Suppliers from Tanzania were subsidiaries of MNCs. The tables also indicate a stable supplier base confirming procurement management staff preference of suppliers with proven capacities and capabilities. To mitigate the risk of buying in appropriate supplier mining firms often had long supply contracts with proven suppliers hence the stable supplier base indicated in Tables 8 and 9.

There was virtually no local value addition in the supplies. The machinery, components, spares and consumables were imported in a ready-for-use form. However, quicklime (Table 8) a consumable used in the processing of gold is mined, processed and packaged in Tanzania. It is produced by Athi River Mining Company a firms with its head offices in Nairobi, Kenya. Other Tanzanian consumable suppliers are the petroleum product supplying firms discussed above.

**Table 6: Processing plant consumables purchases at an unnamed Tanzanian gold mine.**

Firm	Head Office	Scope of service	Change of supplier (2005-2009)
<b>Electrical consumables</b>			
EWI	Perth, Australia	Supply of lights, lugs, tape and electrical tools	No change
Ross Industries	Perth, Australia	Supply of lights, lugs, tape and electrical tools	No change
Hella	Australia	Lamps and 12 volt equipment	No change
<b>Mechanical consumables</b>			
Fuchs	Dar es Salaam, Tanzania	Supply of lubricants	No change
Allied Tanzania	Mwanza, Tanzania	Supply of bearings, jaw liners, linertex, and gear box parts	No change
Wea Warman	South Africa	Supply of pump parts	No change
ITT Flygt	South Africa	Supply of pump parts	No change
Mets Minerals	South Africa	Supply of wear liners	No change
Sandvik Material Handle	Sweden	Supply of conveyors spares	No change
Goodyear	South Africa	Supply of conveyor belts	No change
Mantrac	Multinational	Supply of forklift spares	No change
Lift Rite	Australia	Supply of forklift spares	No change
<b>Chemical consumables</b>			
Athi River Mining Limited	Kenya	Supply of quicklime	No change
Australian Gold Reagent	Australia	Supply of sodium nitrate	No change
Name withheld	United Kingdom	Supply of lead nitrate	No change

Source: This table is based on interviews with an unnamed mining firm in Tanzania (2010).

**Table 7: Processing plant ancillary products purchases by an unnamed Tanzanian goldmine.**

Firm	Head Office	Supplies	Change of supplier (2005-2009)
<b>Electrical goods</b>			
ABB and ABB and Koyo	Australia	Motors, variable speed drives and PLCs	No change
Pierlite	Australia	Security lights	No change
EWI	Australia	Motors and cables	No change
East African Cables	Tanzania	Cables	No change
<b>Mechanical goods</b>			
SPX Process Engineering	South Africa	Gear boxes and agi blades	No change
Wea Warman	South Africa	Warman pumps	No change
Flygt	South Africa	Flygt pumps	No change
<b>Light vehicles</b>			
Telex	Australia	Franna crane	No change
Liebherr	Liebherr crane	South Africa	No change
Lift Rite	Manitou	Australia	No change
Mantrac	Tanzania	Forklifts (DP30) and Cat 424 D loaders	No change

Source: This table is based on interviews with an unnamed mining firm in Tanzania (2010).

The output of the mine site processing plant is gold dorè that requires further processing in gold refineries. Transporting gold dorè from a mine site to a refinery is a major security operation. The mining firms stated that gold dorè was transported by aeroplanes from the mines to the refineries but would not provide details of the firms involved. AGA refines its gold in South Africa at the Rand Refinery in Germiston. A discussion with the refinery revealed that the refinery provides transport and security from the mine to the refinery. A Rand Refinery respondent commented;

*'We will pick up the gold from the mine to the airport and to the refinery. We offer that as a one stop service to our clients.'* (Interview, November 2010).

For security reasons mining house were reluctant to discuss the issues concerning the transportation of gold dorè to the refineries.

## 5.7 Other production linkages

Operating mines often function as communities linked to a number of services available to society at large.

First and very important to a mine is security. Security serves to safeguard mine assets which include capital equipment, consumables, gold reserves and the produced gold dorè. The six large-scale gold mining operations in Tanzania are located in relatively remote places making security a linkage of critical importance. Mining firms have lost gold dorè, gold ore stockpile and fuel. For instance in 2007 the North Mara mine is reported to have lost about two million litres of diesel fuel due to theft. In September 2008 criminals carrying AK-47 assault rifles attempted to access the mine's gold room. A Barrick security guard was shot dead in this incident. These and other incidences raise the spectre of vulnerability of gold mines and hence the importance of the security linkage.

Mine visits indicated three levels of security. The first level of security concerns controlling access to the mine-site. In each of the visited mines entry into the mine site is controlled and restricted to authorized personnel. Personnel operating at this security level are Tanzanian citizens employed by Tanzania domicile security firms. Securing these vast spaces is a challenge for mining houses. One mine reported engaging the communities along its site perimeters as a source of security intelligence and first security barrier. The second level of security is the security barrier around the mine residences, workshops, machinery shades and warehouses. In the two mines visited these security posts were manned by Tanzania personnel regulating and documenting personnel and machinery movements into and out of these premises. The majority of firms at this level were reportedly largely owned by Tanzania resident expatriates from South Africa and Zimbabwe.

The third and most sophisticated security level is that around the offices, the mine pit, processing plant and the gold doré storage premises areas. Access to these sites is strictly limited to relevant personnel. Security measures at this level employ electronic devices to enhance operations. All personnel leaving the mine pit and processing plant area are subjected to metal detection searches. This level of security is largely the preserve of international security firms. In the two mines visited the international security firm Group 4 Security (G4S) personnel manned entry and exit points at this level or carrying out other security functions. All though the lower level guards at this level were Tanzanian citizens, supervision and management personnel were largely expatriates from South Africa.

A second service to security is the catering and camp (residential premises) facilities management at mine sites. Goldstuck and Hughes (2010:44) note that the technical demands of modern large-scale mining operations call for highly qualified personnel and to recruit these skills to remote mining sites, firms often provide comfortable accommodation facilities and international standard catering facilities at these sites. An operations manager in one of the mines remarked;

*'We work 12 hours a day, 7 days a week for 8 weeks..... We have to house our guys well otherwise they won't come [take the employment offers]. We also have to feed them well, it's a hard job but a well fed miner is a happy miner!'* (Interview, February 2010).

Catering for expatriate and senior mines personnel is largely undertaken by of international catering firms such as Sodexho and All Terrain Services (ATR). These firms usual have worldwide operations. For instance, Sodexho caters for the Barrick Gold mining group globally. International catering firms are engaged because of their experience in 'catering for different tastes.' Sodexho's country manager in Tanzania remarked;

*'... ... catering is very critical for miners. It is a fickle business, we have to cater for different tastes, for example a South African menu, an Australian menu, a Tanzanian menu and so forth, it needs experience.'* (Interview, December 2009).

The catering industry purchases both locally and regionally. Locally the firms indicated that they purchased fresh produce (fruits and vegetables) from communities around the mines. Sodexho stated that they support community horticulture projects that supply their business. Supporting these community ensures

that the purchases remain local. The firm has a strict definition of local. Referring to the firm's contract at the North Mara mine the Sodexho's country manager said;

*'Sodexho defines local purchases for North Mara as from the region [Tarime region] and will not buy from traders buying from other regions for re-sale to us. We can buy from there ourselves so why buy from a trader.'* (Interview, December 2009).

The camp management function involves housekeeping in the residential sites. The mining firms stated they often engaged communities around the mines in this linkage. In the two mines visited local women were observed cleaning the residences and the men attending to the gardens and other general maintenance work like painting and plumbing. Management in both mines stated that this was a means of integrating the local communities.

The third ancillary service is the provision of transport. Mining firms routinely provide transport to employees not accommodated in the mine-site residences. Mining firms have standing contracts with local bus owners and firms to provide transport to and from the mine. The fourth and final ancillary service is the supply of office provisions. These comprise stationery and office equipment like computers, printers and facsimile machines. All the three mining houses stated that all stationery and some office equipment were sourced from Tanzanian traders. The firms stated that they maintained a vendor list and that all purchases were subject to the 'three quotations rule', that is buyers had to seek quotations from at least three suppliers before making a purchase.

Tanzania's stationery manufacturing industry is largely limited to paper product such as writing pads and books. The country does not produce printing paper, computers, printers, staplers and related office stationery. In addition the locally produced office furniture range is also limited. The mining firms stated that local suppliers imported such supplies and that they bought from these importers allowing for supplier margins that cover import duties, transport, overheads and profit. Supporting local importers is a programme initiated and supported by Tanzania Investment Centre in collaboration with the United Nations Conference for Trade and Development (UNCTAD). The two organisations stated that they were running a supplier development program aimed at introducing Tanzanian citizens to the latest technologies through supporting import programmes. The organisation argued that the move was to ensure that even if goods used in the sector were imported, the country's citizens benefited by being the importers instead of foreigners. Their argument was that perhaps that could transfer technology and skills later on when importers sought to service and maintain some of the imported equipment.

## **5.8 Determinant of linkages; mining firms and suppliers views.**

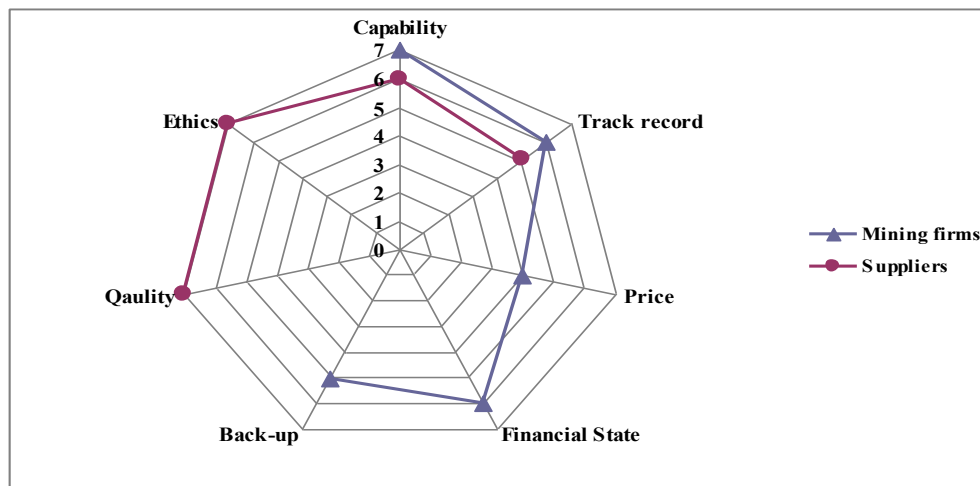
Mining houses were asked to identify critical factors they considered in selecting goods and services suppliers. Similarly suppliers were also asked to identify factors they considered critical for winning tenders and getting orders. The respondents were asked to define and explain their own factors (here after referred to as critical success factors (CSF see section 5.4). The aim was to compare and contrast the buyers and sellers CSF. In addition both groups were asked to rank these CSF on a

scale of one to seven where one was the score of least importance and seven as score of highest importance.

The mining firms mentioned six CSF as follows; (i) **Capability**; defined as the ability to timely and correctly deliver the required service or product, (ii) **Price**; defined as the cost of purchasing goods and services, (iii) **Financial state of the supplier**; defined as the ability of a supplier to fund its supplies without resorting to advance payment, (iv) **Back up**; defined as the ability to guarantee goods and services in cases of failure of stated goods and service to meet stated objectives, (v) **Track record**; defined as a traceable history in supplying specific products and services. Track record was particularly desired for the '*big hitting stuff*' like heavy mining equipment, reagents and chemicals used in the mine and (vi) **Safety policy**; defined as a measure of safety records and policy suppliers. This was critical for service providers who have to work on mine-sites.

Goods and services providers mentioned two CSF; track record and capability (as defined in the exploration sub-chain). They also mentioned two order-qualifying factors quality defined as meeting or surpassing customer expectations in delivering goods and services and ethics defined as following established business practices and acting honestly in all dealings<sup>14</sup>.

Figure 10 provides a graphical representation of average scores awarded by two of the responding groups, the buyers and sellers.



**Figure 10: Comparison of buyers and sellers Critical Success Factors scores.**

Source: This figure is based on interviews with procurement managers in mining firms and suppliers of goods and services to the mining firms (Interviews 2010).

The figure indicates that mining houses rank highly the capability, track record and financial position of suppliers when adjudicating tenders or selecting vendors. The price of these goods and services was rated lowly and the suppliers did not even mention it. The common view was that the prices of mining goods was internationally

<sup>14</sup> Terry Hill (2000:36-39) make a distinction between order qualifiers and order winners. This Report does not make this distinction. It handles both order winners and order qualifiers as CSFs in purchasing practices.

determined, different countries effected adjustments to suit local conditions and the range of adjustment rates was established. A mine purchasing manager commented; *‘... .... the price is not as important because we allow for a marked increase allowing for importation and transport that we will have to do in any case to import it from abroad...’* (Interview, February, 2010).

Although both capability and track record were commonly mentioned by both the buyers and sellers the two ranked the two factors differently. Buyers ranked both factors higher than the suppliers indicating the difference of focus between the suppliers and buyers. The graph also indicates the gap that the suppliers have to work on to meet buyers needs. In particular it indicates that suppliers have to highlight their financial position and ability back up their supplies whilst maintaining and improving their other positive attributes.

In addition to identifying the CSF, the study also sought to identify the geographical location of goods and services providers to the county's gold mining sector.

## 5.9 Spatial distribution and classification of suppliers.

The study sought to identify the geographic location of the suppliers of goods and services to the gold mining sector and also track any shifts in spatial distribution of suppliers. The spatial distribution of suppliers was divided into geographic regions as in Tanzania, the EAC, SADC, the rest of Africa and international (meaning anywhere outside Africa). In Tanzania the locations were classified as within a 20 kilometre radius of the mine, within the country region (political map) and anywhere else in Tanzania. Only one mining firm out of three responded. Table 10 summarizes the response indicating the spatial distribution of the registered goods and services providers similar to that of the exploration sub-chain source (see figure 8).

**Table 8: Spatial distribution of suppliers (as a % of number of suppliers) in an unnamed mine in Tanzania.**

Location	Registered goods vendors (% of total registered vendors)				Registered services vendors (% of total registered vendors)			
	2000	2005	2009	2012 projected	2000	2005	2009	2012 projected
Immediate (within a 20km radius of mine)	n/a	18	17.5	17.6	n/a	n/a	18.9	n/a
Regional (e.g. Kahama or Geita)	n/a	11	20	25.6	n/a	n/a	6.5	n/a
National (rest of Tanzania excluding liquid fuel)	n/a	3.6	15.6	19.6	n/a	n/a	19.6	n/a
National (Rest of Tanzania, liquid fuel)	n/a	0.9	0.3	0.3	n/a	n/a	n/a	n/a
East African Community	n/a	2.7	3.2	4.5	n/a	n/a	1.5	n/a
SADC	n/a	12.6	16.2	n/a	n/a	n/a	34	n/a
Rest of Africa	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rest of the World	n/a	49.5	29.8	32	n/a	n/a	19.6	n/a
Total	n/a	100	100	100	n/a	n/a	100	n/a

Source: This table is based on interviews with an unnamed mining firm in Tanzania (2010).

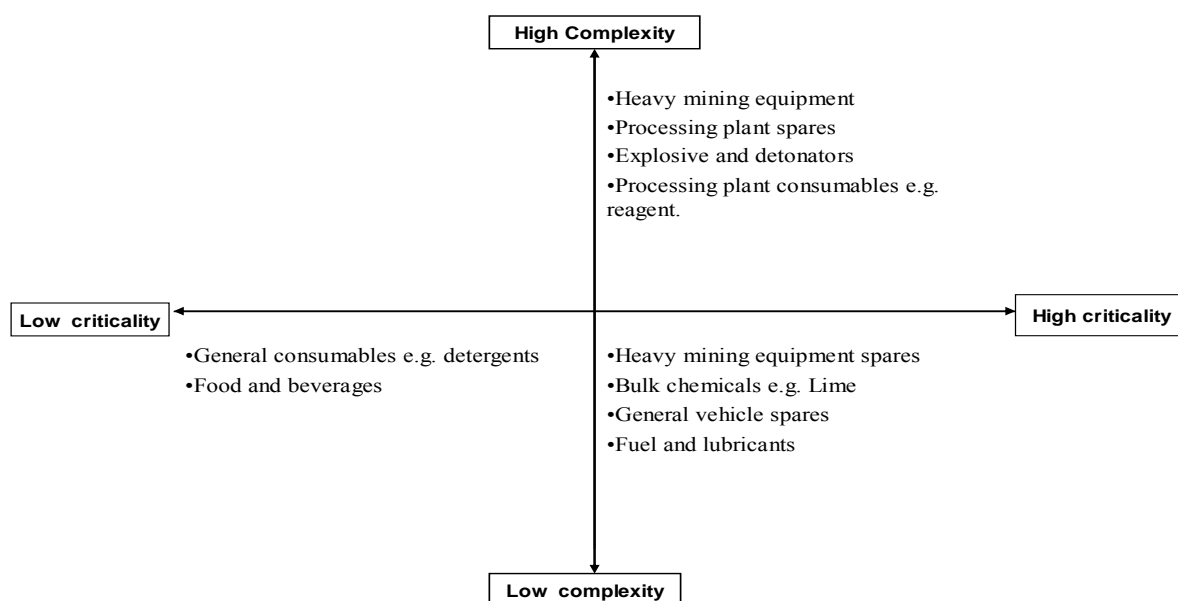
Table 10 indicates that the percentage of local registered goods vendors (excluding fuel) grew from 33% of the in 2005 to 53% in 2009 and the firm projected that local



vendors will make up to 60% its registered vendors by 2012. Whereas the mining firm projected growth in registered vendors under the Tanzania excluding liquid fuel label from 15.6% in 2009 to 19.6% in 2012, suppliers within a 20km radius of the mine appear to have reached a maximum. One reason could be that the communities with a 20km radius being largely rural limited to supplying agricultural produce only. Registered goods vendors from outside on the other hand Tanzania declined from 65% in 2005 to 49% in 2009 and is further projected to decline to 37% in 2012. The shift in trends in favour of local suppliers was attributed to the mining firm buying goods from local importers. This transferred stock holding from the mining firms to the local importers impacting the explorers and mining firms' cash flows positively.

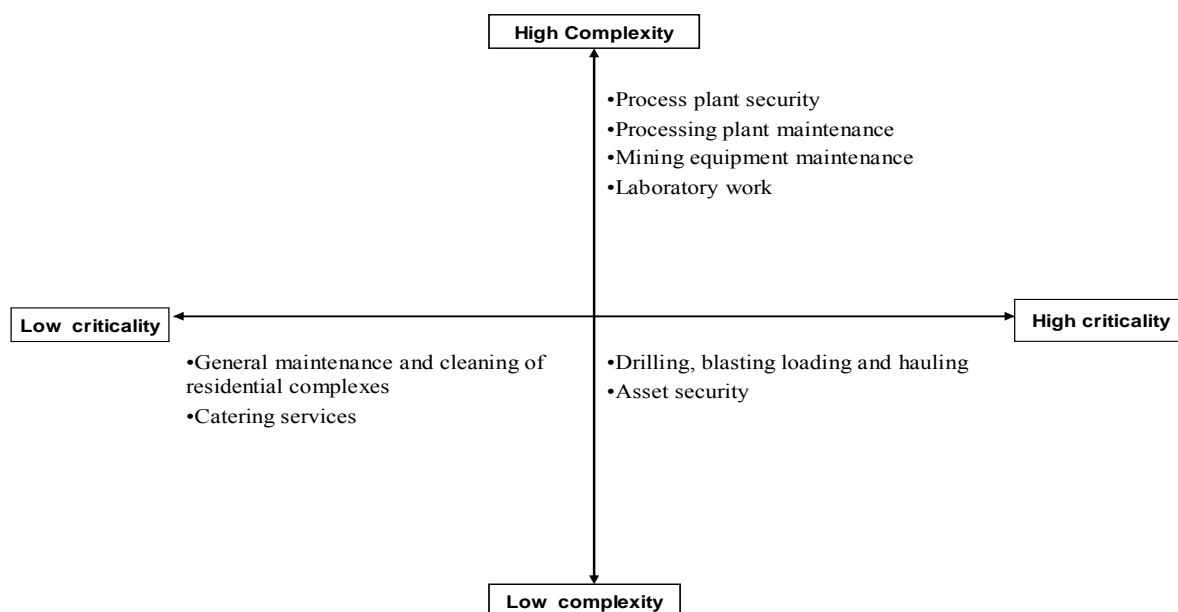
The trend on the supply of services could not be ascertained because of the non availability of data. However, year 2009 data indicates that suppliers from outside Tanzania dominated supplies with 55% representation in number of registered services vendors.

In addition the enquiry sought to define the purchased products and services in two dimensions; complexity and criticality with each parameter rated as either high or low. Figures 11 and 12 summarise the responses from the three mining firms.



**Figure 11: Classification of purchased goods.**

Source: This figure is based on interviews with mining firms in Tanzania (Interviews 2010).



**Figure 12: Classification of purchased services.**

Source: This figure is based on interviews with mining firms in Tanzania (Interviews 2010).

Using a geographical classification used to identify the location of goods and service provider in sub-section 5.4.1 (Figure 8 page 30), the results indicate that goods and services classified as highly complex and highly critical were largely sourced from the international markets outside Africa. Goods in this group include heavy mining equipment supplied by OEMs, spares for this machinery and specialized chemicals not produced in Africa (Figure 11). South Africa a country with OEM assembly plants was mentioned as the regional source of these goods with.

The servicing of this machinery under the supplier and maintenance contracts was also classified as a highly complex and highly critical undertaking (Figure 12). Also classified similarly was the third level security around the processing plant and the gold ore (unprocessed) and processed gold dorè. Third level security was classified as such because some mine has been victims of robberies losing gold dorè, fuel and machinery in the process.

The firms regarded the mining and plant spares as a low complexity and high criticality goods (Figure 11). As a result they allowed local importers to supply these as a means of reducing their own stock holding. With no local value addition on the spares the practice only serves to transfer stock holding from the mining firms to suppliers. Also in this quadrant were vehicle spares bulk chemicals like lime and fuels and lubricants. The majority of goods in this quadrant were imported with no local value addition except for lime which is mined, processed and packaged locally and lubricants that are imported in bulk and repackaged in smaller containers locally. Services in this quadrant (Figure 12) included the level two security large concerned with immobile mining equipment. Interestingly contract drilling, blasting and hauling

was also said to be a low complex but highly critical service. The service was said to be of low complexity because the mining firms guided the drill sites and blasting techniques guided by geological skills. A mine geologist explained;

*'We guide them [Contract miners] where to drill following the gold, the number of holes and the blasting so we can have the rock sizes the plant can handle and also so that the pit or tunnel does not collapse...'* (Interview, February 2010).

The majority of goods and services in this quadrant were from regional sources with South Africa dominating the supplies. Mining firms were however reluctant to provide numerical indication of this domination.

Local purchases were largely confined to the low complex and low critical quadrants for both goods and services. In the case of goods the supply purchase was limited to food and beverages (Figure 11). Even then the firms often imported branded food and beverages to meet the tastes of its expatriate staff. Responding goods and service providers however could not classify the products and services in a similar manner stating that they did not view the goods and services they provide in these dimensions

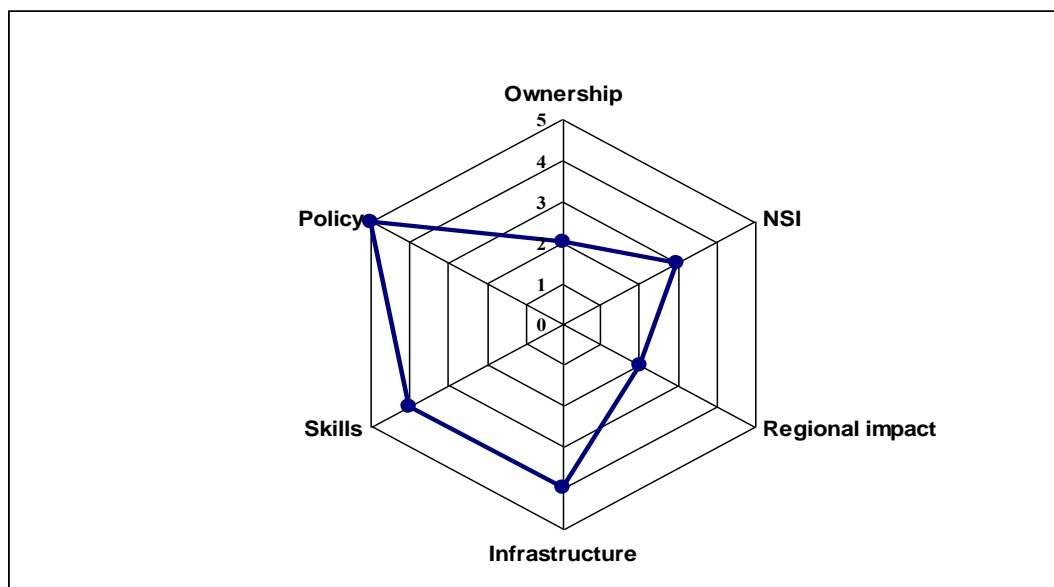
An interesting development was that a number of firms were establishing agencies to serve a range of industries in the country. Mantrac for instance serves mining firms and road construction and maintenance firms as well. Often these agencies served to import machinery and component with no local value addition outside the logistic linkages.

Although evidence indicates limited local linkage in the two sub-chains, both the exploration and mining firms stated willingness to engage local supplies. They however clearly stated that engagement was dependent on the suppliers meeting stated conditions, the CSF. The next section looks the nature and extent of linkages as driven by the interaction of these CSF and the six MMCP issues.

## **6.0 To what extent do MMCP hypotheses explain the extent and diffusion of backward linkages in Tanzania's gold mining sector?**

In section 3.1 the study posited that the nature and extent of linkages in the gold mining sector of Tanzania is a function of six variables. Findings indicate that the six variables underline the nature and extent of linkages in the sector.

Notwithstanding the poor state of both soft and hard infrastructure in Tanzania, the weak institutional capacity and the inadequate supply of skills (particularly in the immediate post liberalisation period), This report argues that policy is the main driver and/or determinant of linkages in Tanzania's gold mining sector amongst the six MMCP variables. Using a one to five scale where one is not important and five most important, the policy factor scores maximum five. Figure 13 below shows a graphic representation of scores per variable based on the author's judgement arising from extensive fieldwork on linkages in Tanzania.



**Figure 13: Ranking of MMCP linkage drivers.**

Source: This figure is the author's perception of the six MMCP issues.

The definition of the meaning of policy is fluid (see Smith, 2003 and Torjman, 2005 for example). However, generally, policy is defined as a plan to guide action towards concerted goals and/or objectives.

Policy occurs in two spheres, namely the public sphere and private sphere. In the public sphere, policy is the domain of government and it can derive from central or national level, regional level and local level (country, province or city). Public policy concerns laws, regulations, decisions and actions. In the private sector sphere, policy concerns business strategy formulation and execution.

Public sector policy is the main driver of development of basic social infrastructure, including education and technical skills, roads, power and water supply, telecommunication, and NSI in general, which are critical for the development of linkages between the mining industry and the local economy. The current scarcity of these resources in Tanzania is limiting the potential of development of linkages. That is why infrastructure and skills factors are awarded the score four and the NSI factor is awarded the score three because a functional NSI can be argued to both a cause and an end of availability of good infrastructure and relevant skills. Both the ownership and impact of regional economies drivers were awarded a low score of two because their significance is small compared to the gaps in infrastructure, skills and the NSI.

Awarding these scores is not a suggestion of a priority list of prerequisite drivers to be adopted by emerging countries seeking to develop local linkages to their natural resources sectors. Each of these drivers is a cause as well as an end of the process of developing local linkages and as such deserve due care and attention.

Before discussing the policy regime as the major driver of linkages in the gold mining sector of Tanzania a detour to broadly outline the policy regimes that have dictated the economic development strategies in Tanzania is in order.

## 6.1 Development Policy changes in Tanzania

Šolar *et al* (2009: 305), argue that with a few exceptions policies change over time to reflect dominant perceptions and realities. The authors further argue that purpose of public policy is to direct or control actions by government bodies or the public so as to achieve desired ends or objectives.

An examination of changes in the economic development policy regimes in Tanzania confirms these arguments. The successive governments of Tanzania since independence have always had a vision to bring economic development to the citizenry. To attain these objectives the GoT has pursued various programmes under different policy regimes. In the immediate post-independence period the government retained the policies of the predecessor colonial regime. The economy remained market oriented and dominated by the private sector. Even if the government had political capacity to alter the policy regime it opted to maintain the doctrine of market oriented and private sector dominated means of production.

However the inherited liberal economic policies did not bear the expected 'fruits' of independence for the majority of the people. The disappointing outcomes of the times have been attributed to inadequate donor support and deficit in capacity to implement government programmes amongst other reasons. Consequently the government abandoned the liberal economic policies and opted for a centrally directed economic growth policy as did a number of African countries that faced similar challenges. This option for centralised planning gave birth to the Arusha Declaration proclaimed in 1967<sup>15</sup>. The declaration set Tanzania on an African version of socialism trajectory dubbed *Ujamaa*. Under the *Ujamaa* ideology the government nationalised the country's major means of production which included gold mines that were operational at that time and set agriculture as the projected backbone of the economy. The socialist policies however also did not yield the desired results. The nationalised enterprises faced challenges that include inadequate technical and managerial expertise, over-employment and embezzlement amongst others (Ngowi, 2009). In addition to these challenges, the 1978/79 war with the Idi Amin ruled Uganda is argued to have worsened a bad economic situation in Tanzania. By the early 1980s the economic situation in Tanzania compelled the political leadership to seek alternatives to *Ujamaa* policies.

After initial resisting overtures of assistances from the International Monetary Fund (IMF) and opting for home-grown economic reform programmes, the country finally formally adopted an IMF supported reform programme in 1986 (Nord *et al*, 2009). Under the programme Tanzania abandoned the state centralised planning approach to economic development. Virtually all sector of the economy were opened to domestic and foreign private enterprise (*ibid*).

A typical feature of the reforms in Tanzania is that they have been gradual, steady and sustainable. Muganda (2004) argues that sustainability arose from political will to reform the economy. She further argues that the process has been gradual because

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<sup>15</sup> See The Arusha Declaration (<http://www.marxists.org/subject/africa/nyerere/1967/arusha-declaration.htm>- accessed 30 January 2011).

the political leadership sought a 'wide domestic consensus and a broader understanding of issues (ibid).

The current pursuit of economic development in a liberal environment in Tanzania is guided by the Tanzania Development Vision 2025, better known as Vision 2025. Formulated in 2000 the vision replaced the Arusha Declaration policies of 1967. The objectives of Vision 2025 are not different from the aims of the Arusha Declaration. Vision 2025 seeks to address the question of poverty through setting the country on a sustainable development path. The policy vision also **regards agriculture (and agro-based industries) as the springboard for sustainable development** [emphasis added] as did the Arusha Declaration<sup>16</sup>. Other sectors are not mentioned separately but the vision notes the importance of manufacturing and tourism.

However Vision 2025 is operating in a different environment compared to that of the Arusha Declaration. Vision 2025 is in a liberal economy in which the country's economy is open to all players, local or foreign and in an environment in which policy making has become internationalised. Mallya (2000) argues that internationalised policy making is restricting the policy space of poor countries relative to that of rich countries and international finance institutes (IFIs) the reforms. The Arusha Declaration in contrast had to implemented in an inwardly looking economy and in midst of the cold war.

Despite the discourse on the merits and demerits of reforms Tanzania has steadily pursued the reform process, amending its meso-policies<sup>17</sup> to reflect the new policy thrust. Some of the amended policies include the Trade Policy, the Education Policy and central to the study the Mineral Policy amended in 1997 giving birth to the Mining Act, 1998 which replaced the 1979 Act.

## 6.2 The policy factor

An examination of progress made in meeting the objectives of economic reform policies objective indicate that in general some of the objectives have been met. Tanzania has transformed from an inward focusing economy dominated by state ownership of the means of production to a liberal private sector dominated capitalist economy. Although macro-economic indicators have been positive on the overall some objectives of meso-policies have not been met.

The Mineral Policy of Tanzania, 1997 is the result of the economic liberalisation strategy of 1986 and is part of the meso-policies formulated to realise the objectives of Vision 2025. In the 1997 mineral policy, the GoT acknowledges the important role that the mineral sector in meeting the objectives of Vision 2025. The GoT recognizes the need for an 'internationally competitive investment environment for the mineral sector' (Mineral Policy of Tanzania, 1997: 1) and the potential that the minerals sector offers to achieving rapid national economic recovery and development (Mineral Policy of Tanzania, 1997: v). The policy had a vision of developing a strong, vibrant, well organised private mining sector led, large and small-scale mining industry contributing in excess of 10% of the country's GDP.

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<sup>16</sup> See the Tanzania Trade Policy, 2003

<sup>17</sup> Meso-policies are sector policies. These are targeted policies such as industrial policy environmental policy, education policy and technology policy.

The policy demonstrates political will to develop linkages in the sector. It articulates a vision of developing mineral sector support services and facilities. Section 3.3.10 of the policy makes reference to a vision of integrating mining into the national economy, (Mineral Policy of Tanzania 1997:19-20). In essence this is vision of developing local linkages to the sector. The section makes a tacit reference to backward linkages stating a vision of 'Developing the country's ability to provide essential inputs to the mining sector.' Discussions with government official suggest that this meant developing both backward and forward linkages. However Section 3.3.10 later explicitly makes reference to forward linkages in points 3.3.10 (ii) and 3.3.10(iii) of the section which make reference to the need to offer incentives that promote local mineral beneficiation investments through the development of value adding activities. The GoT has demonstrated political will to develop linkages in the sector. The objectives of the Mineral Policy, 1997 indicate political will. However the objectives of these and other sections of the Mineral Policy of Tanzania, 1997 lack specific targets. In addition there are no specific incentives for achieving the objectives and equally no sanctions for failure to achieve them, presenting a policy implementation conundrum. In the introduction a book titled 'Mining in Africa; Regulation and Development' Bonnie Campbell (2009) argues that regulatory reform frameworks introduced in a number of African countries are of external origin. She argues that the African countries have not had much input in policy formulation. Instead multilateral funders like the World Bank and the IMF and mining MNC have had a dominating role.

The reform experience in Tanzania however indicates otherwise, Tanzania at first turned down IMF assistance due to differences in reform policy perspectives. Although the IMF was engaged later on, Tanzania still sought to retain a degree of control in the reform process leading to a suspension of assistance by major funders of the reform process. The impasse was finally dealt with in a review process now known as the Helleiner process<sup>18</sup>. The events leading to the Helleiner process contradict Campbell's (2009) analysis. Instead the events demonstrate Tanzania ability to 'stand up' to external funders. In the aftermath of the Helleiner process one would have expected Tanzania to negotiate from a stronger position resulting in meso-policies that mirror government objectives. However and surprisingly some provisions in the Mining Act of Tanzania, 1998 indicate a bias towards imported goods and services compared to local supplies. This suggests that Tanzania did not capitalise on the momentum gained by concessions gained by the Helleiner process. As a result, local linkages are limited to low rent activities such as the supply of food and beverages. The high rent activities like the supply and servicing of highly technical goods and services are dominated by foreign suppliers (good and services in the right hand quadrants see Figures 7, 11 and 12). This study thus posits that the nature and extent of linkages in the country's large-scale gold mining sector is a result of the policy regime.

First, policy goals are ambiguous, setting general goals instead of specific goals. For instance the policy states the need to develop local linkages but does not specify what sort of linkages and set not targets. It also lacks the incentives and sanction

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<sup>18</sup> The process was an initiative of the Danish government in agreement with the Tanzanian authorities to evaluate Tanzania-donor relations during 1994. It was led by Professor Jerry Helleiner from the University of Toronto and had Professors Ndulu (currently the Governor of The Bank of Tanzania), and Lipumba of Tanzania and Professor Svendsen of Denmark.

instruments. This is in contrast with the South African Mining Charter that has specific goals in term of supplies, local value addition and human resources with regard to historical disadvantaged South Africans. In addition the Mineral Act 1998 placed no statutory obligations on miners and explores to develop local supplies. If anything the Act instead grants imports tax exemptions on specific imports effectively limiting the need to develop local supplies. The development of these supply capabilities is an effort that involves both the private and the public sector. The public sector usually plays a leading role in providing public goods developing the critical mass human capacity and the private sector usually assist develop specific capabilities to satisfy its specific needs.

Second the policies exhibit some incoherencies<sup>19</sup>. For instance although the country has broad objectives to develop local human capabilities the government is allowing expatriate labour into the sector. MDAs agreed between government and mining firms at times even include the anchor firm's contractor and sub-contractor labour requirements for the entire life of a mine. Although this guarantees the miner unrestricted supply to world class supplies it limits the local access to these supplies. Third some policies set to assist develop local capabilities have not been met. Policy objectives have not progressed beyond the rhetoric. For instance although miners, explorers and suppliers agree that there has been improvement in the quality and quantity of infrastructure in Tanzania they also point out that the developments have not been enough to attract investment in the manufacturing sector. Utilities supplies continue to be erratic and inadequate thus discouraging investment in the sector. Various proposed infrastructure projects have not been implemented. Roads leading to some mines remain unpaved and some mines like the Geita Gold Mine are yet to be connected to the national electricity grid. Government attributes this to lack of financial means to develop this and related infrastructure.

Fourth, import tax and duty exemptions on imported goods, spares and components is not extended to importers of raw materials destined for local fabrication of similar goods, spare and components. This renders local fabricated supplies expensive compared to imports.

Buyers firms' (miners and explorers) policies are also a critical determinant of the nature and extent of linkages in the two sub-chains. In work examining about the Japanese car-maker Toyota, Cusumano (1985) demonstrates how a bed-rock firm can develop an efficient and reliable supplier base as means of improving efficiencies. Evidence from discussion with procurement managers of the mining firms indicates that firm policy determines purchasing decisions. Interesting all the procurement managers expressed the desire to purchase locally. The managers stated that importing goods and services was very expensive. Importing goods often led to firms holding up to six months stock of critical suppliers to mitigate logistical deficiencies of timely supplies if stock holding was low. They also stated that imported services also attracted a premium charges as service providers included the cost of their own logistics as well. However despite these concerns none of the mining firms have well developed and explicit policies of developing local capabilities. Developing local linkages appears to be a personal effort reflecting individual

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<sup>19</sup> The coherence and mutual supportive character of policies in this discussion is limited to examining the main objectives of the Mineral Policy(1997), the Trade Policy (2003), the Education and Training Policy (1995) and Vision 2025 objectives.



preferences. Interestingly all the responding procurement department staff in the three mining firms responded as 'we' to all issues but the 'we' changed to 'I' when responding to developing local supply bases. Typical responses were;

*'I have not looked into that [developing local suppliers]' or "Its something I do when I have time..."* (Interviews, February 2010).

However the mining firms stated that local value addition was not their key concern. The firms support and buy goods from local suppliers as a means of reducing their own stock holdings. Local suppliers attributed the lack of supplier development programmes to the mining and explorer firms' *modus operandi*. Typically expatriate employees work in Tanzania for about eight weeks before going back to their countries for a four week break. In the eight weeks the employees work 12 hours a day without day-offs. With such a tight work schedule key decision makers in the procurement department have limited time to explore local capabilities. In addition the suppliers stated that procurement personnel are risk averse because of the incentives structure by the buyer firms. They stated that key decision makers in the procurement departments have incentive linked targets and were thus not prepared to risk engaging new suppliers that could jeopardise their incentives. The procurement personnel however denied this stating that they were instead by the aforementioned CSF irrespective of the source of supply of goods and services.

Only one firm, ABG had evidence of a supplier development programme. ABG has run a number of workshops in Dar es Salaam and Mwanza. In the workshops the firm informed potential suppliers on procedures to register as a vendor and the determinants of successful registration. In addition an engineering firm in Mwanza (name withheld) stated that they had received limited capacity development assistance also from ABG.

The policy dimension (both public and private), its implementation or lack of implementation because of various reasons, its coherencies and incoherencies and, goal clarity and ambiguities impacts the other MMCP variables leading to the current nature and extent of linkages in the country's gold mining sector. The policy dimension through these five MMCP issues influences the ability of existing local firms and the development of new firms capable of meeting the CSF as defined by the buyers; the explorers and the miners. Table 11 summarises the interaction between the six MMCP issues (independent variables) and the CSF (dependent variables) giving rise to the nature and extent of linkage in Tanzania's exploration and production linkages sub-chains of the gold mining value chain. In the table, XXX denotes a strong interaction between independent and dependent variable XX indicates moderate interaction and X denotes weak or no apparent interactions. The distribution of the number of Xs is based on the author's judgement. Subsequent discussions are limited to strongest interaction of independent and dependent variable as driven by the policy regime.

**Table 9: The interaction of independent (MMCP) variables and the critical success factors (dependent variables).**

Independent variable		Dependent variable							
		Capability	Track record	Quality	Ethics	Safety policy	Price	Financial State	Back up
Policy	Ownership	XXX	XXX	X	X	X	X	X	X
	Skills	XXX	XX	XXX	X	X	XX	XX	XX
	NSI	XXX	XX	X	X	X	XX	X	XX
	Infrastructure	XX	XX	X	X	X	XXX	X	XX
	Regional impact	XXX	XX	X	X	X	X	X	X

**Source:** This table is the author's weighting of the six MMCP issues.

The policy variable drives the other five MMPC (independent) variables and the identified dependent variables to impact the extent and nature of the exploration and production sub-chains linkages as follows:

*(i) Ownership*

At the time of the study the ownership of bed-rock firms and their respective suppliers in the two sub-chains exhibited an interesting contrast. Whereas all the bed-rock production firms are of foreign origin the exploration field comprises of both foreign and local firms. Also service supplies appear to have developed more local linkages in the exploration sub-chain than in the production sub-chain. Two factors give rise to the status quo.

First economic liberalisation opened the economy to both foreign and local private enterprise. The Mineral Act of Tanzania, 1998 has specific provisions specifying and differentiating conditions that govern local and foreign private sector enterprise participation in the exploration and production sub-chains bed-rock activities (exploration and mining).

As a result local and foreign firms have established operations in the two sub-chains. Alongside the anchor firms suppliers have also set-up operations to provide goods and services to the two sub-chain anchors. Again the distribution of these supplies exhibit more local linkages in the exploration sub-chain compared to the production sub-chain.

The second reason for the status quo is the differing capital intensity of anchor activities in the two sub-chains. Production comprises of capital intensive linkages such as drilling, blasting, loading and hauling. Mine production machinery is not only costly to purchase but also costly to operate and maintain. A mining firm procurement manager used the fuel consumption of loading and hauling vehicles to illustrate the point. Besides high operational costs, production is preceded by the expensive mine construction linkage. The construction of some mines exceeds US\$1 billion, a high upfront cost beyond the reach of local players. Foreign firms usually have access to relatively cheaper funding sources and access to own reserves to finance some of these costs. Additionally, operating large-scale mining operations demands high and in some cases specific technical capacities and capabilities. Local firms lack these

capabilities and capacities. When Tanzania liberalised its economy foreign firms with the appropriate capacities and capabilities seized the opportunity at the expense of local firms, deficit in these attributes. Under the *Ujamaa* policies the mining sector was not a priority. As result in the *Ujamaa* era mining related capabilities and capacities were not adequately developed and nurtured to compete at a global level. With no capacity, capabilities and no track-record in the field local firms are also unable to attract funding in the field. Although the Mineral Policy recognises the importance of financing activities in the sector a proposed programme to finance local firms in the sector is yet to be implemented.

Exploration on the other hand is **relatively less** capital intensive [emphasis added]. Exploration tasks like desk bound work such as target and area selection only require capital equipments such as computers and finance to purchase geological data from GST in addition to expertise in the field. Field-based work like gathering geological data although risky are financially less demanding compared to constructing and running a mine. Besides exploration fieldwork does not require expensive infrastructure expenditure. Explorers are often only concerned with accessing selected explorations site and gathering data as samples, photographs and other related forms. In their work explorers often use hired equipment to collect data and establish temporary field operating bases. Also promising exploration projects often change hands. Holders of exploration rights often proceed with exploration processes as far as their technical and financial capabilities and capacities allow and thereafter either dispose off these projects or go into partnership with better endowed explorers. Better endowed explorers often buy exploration projects from smaller firms without the financial and technical capability and work on them up to the bankable feasibility study (BFS) linkage.

A relatively lower entry barrier in a liberal environment that allows profitable disposal of projects has seen a number local as firms or individuals securing exploration claims. In 2010 an exploration expert estimated there were about 1200 local claim holders (Spencer, 2010). An interesting feature is that the majority of this group of claim holders neither have the financial nor technical capacities and capabilities to carryout exploration work. Often they dispose these claims in part or in whole to firms and individuals with the prerequisite capacity and capabilities. Allowing local claim holders to sell their claims to either local or foreign buyer contradicts sector policy aims of ensuring that Tanzanian citizens retain a post liberalisation a stake in the industry. Often the buyers of these claims are foreign owned exploration majors or juniors. ABG acknowledges the practice of buying primary licences from the locals. The firms' prospectus notes;

'Because the application for and ownership of primary mining licences under the Mining Act is restricted to Tanzanian citizens or corporate entities comprised entirely of Tanzanian citizens, the ABG Group does not hold any licences of this type. It has, however, over the years entered into various arrangements with holders of such mineral rights to facilitate surrender of their rights. In some instances the arrangements that have been agreed to necessitate only a surrender of the primary mining licence to which such Tanzanian citizens were entitled, so that the rights held by the Barrick Group under the prospecting licence covering the same area could dominate. ... .. Compensation to the holder of the primary mining licence most generally

included both cash payment and grant of a royalty right on future gold production.’ (African Barrick Gold plc Prospectus 2010:90).

The status in the ownership of goods and service supplier firms is also a function of the policy regimes. On liberalising the economy Tanzania had a weak manufacturing base in general and the situation with mining related supplies industry was even worse. The mining sector was not an *Ujamaa* priority that prioritised agro-based industry. Growth in the mining related manufacturing and services industry has not been forthcoming for a number of reasons. Although the policy specifically calls for the development of mineral sector supporting industry the call is yet to materialise. However some Tanzanian owned drilling services firms have been established, but there is no local value addition on spares and components of machinery used in these services. A common practise in Tanzania is that suppliers and buyers of heavy machinery enter into supply and service contracts. As a result spares and components are imported only to be fitted into the machinery with no local value additions.

The policy has no specific value addition targets for machinery, spares and components. Instead legislation in Tanzania grants unrestricted imports of certain goods and services to the sector. However importers of raw materials for local fabrication and assembly of components, spares and equipment are not exempt from duty payments. This practice renders locally fabricated goods expensive compared to imports. In a liberal environment which allows duty exempt imports this implies that local manufacturers have limited opportunities to build a good supplier track-record and prove their capabilities (CSFs of integrating into the sub-chain) on the basis of uncompetitive pricing that has to include import duties.

This generous access to imports is not only restricted to goods but is also open to diffuse supply of skills.

#### (ii) *Skills and labour spillovers*

Literature, (for example Czelusta and Wright, 2002 and Goldstuck and Hughes, 2009) argues that modern large-scale mining and its supporting manufacturing, processing and services industries are skills-intensive sectors. Skills determine capability and *ceteris paribus*, capability delivers high quality product and services, leading repeat purchases that build a good track record. For both buyers and producers of goods and services, appropriate skills often manifest in efficient operations leading to improved profitability that *ceteris paribus* gives a firm a strong financial fundamentals. Goods and services providers often pass efficiency savings to buyers as reduced prices for high quality goods and services.

The infant large-scale mining sector of Tanzania is characterized by a skills deficit that the government acknowledges. To mitigate skills deficit the Mineral Policy (1997:20) called for the establishment of training institutions in relevant core and industry supporting skills and motivating foreign investors in the field to train Tanzanians in the skills developing the requisite skills. Tanzania has a number of training institutions offering both generic and specific mining related training. Three institutions offer specific mining industry related education and training. First, there is the University of Dar es Salaam (UDSM). The UDSM offers mining related courses through the geology department and the College of Engineering and Technology

(CoET) both at bachelor's degree level. The geology department however also offers limited postgraduate studies at Masters Degree level. In the majority of cases postgraduate education was pursued abroad largely through donor-funded scholarships channelled through the MEM. The ministry and private sector reported a trend of staff movement from the private sector to the ministry in order to access the post graduate study opportunities. UDSM staff stated that the mining boom in Tanzania had resulted in an increase in enrolment in mining related studies.

Second the country has a specific geological sciences and mining sciences institution, the Madini Institute in Dodoma<sup>20</sup> awarding diplomas. The institute works closely with the MEM and the GST in training staff and conducting geological projects in country. Third, ABG and AGA in collaboration with the Tanzanian Chamber of Minerals and Energy (TCME) and Vocational Education and Training Authority (VETA) have embarked on a technical training project named the Integrated Mining Technical Training (IMTT). The programme is specifically designed to train artisans (tradesmen) and is resident at the Moshi VETA institute. Authorities at these three institutions were reluctant to provide numerical evidence of the institutions graduates. Even with these training efforts, experienced mining related skills were said to be in deficit. Although the mining and exploration firms did not provide numerical data on recruitment and training expenditure indicating their engagement of Tanzanian citizens the firms instead expressed concern about inter-mine staff movements. Complaints were that staff often moved to 'greener pasture' after intensive in-house training. A geologist with one of the major explores stated;

*'.....I have seen firsthand how much [many] of the local Tanzanians we have lost the first year I was here. ... I have seen [I saw] 7 or 8 geologist resigning in 2007 because of that [high demand for trained and experienced geologists]. They were just being poached and paid higher salaries.'* (Interview, February, 2009).

Besides inter-firm skills movements concerns were raised about what was referred to as 'noticeable' skills emigration. The UDSM, the MEM, the explorers and the mining firms all confirmed a trend of mineral sector qualified Tanzania citizens opting to work abroad. It was reported that this was because of the wage differential between similarly qualified Tanzanians and expatriates. The head of the geology department at the UDSM confirmed that some graduates from the university were working in South Africa, the Democratic Republic of Congo, China and Australia. The wage differential is company level policy. Firms acknowledged this stating that premium wages for expatriate was a common worldwide practice used to attract high calibre skills. Any interesting observation is that although the Mineral Policy calls for the developing local skills it however has no strategy to retain the skills. In effect large-scale miners through Mining Development Agreements (MDA) often negotiate agreements that allow unrestricted expatriate labour for themselves and their service providers. For instance the Policy Forum in a publication titled 'The demystification of mining contracts in Tanzania' (undated) cites the Tulawaka and Buzwagi (both ABG mine) MDA clauses pertaining to labour rights as granting the two mines, their contractors and sub-contractors the freedom to employ non-Tanzanians. The clause further states that the GoT will 'expeditiously grant such persons all necessary work permits, visas and passes for this purpose' (Policy Forum, undated: 3). Such

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<sup>20</sup> See-<http://www.nacte.go.tz> (Accessed September, 2010).

guarantees of access to expatriate labour are often valid for a mine's life span as they do not have provisions limiting expatriate terms of employment in Tanzania. Such clauses contradict the objectives of developing local competencies.

The Mining Act, 1998 has no specific time, numerical and level targets for Tanzania nationals in the firms operating in the industry. The mineral policy although calling for the development of local competencies has no targets and milestones to measure progress in that regard. This lack of specific targets is a sharp contrast with the South African Mining Charter. The Charter aims to benefit Historical Disadvantaged South Africans (HDSA) with specific targets of 40% HDSA employment at management level within 5 years of Charter publication and sets other targets at all levels. In addition the Charter has specific tax incentives and sanctions for successes and failures. The lack of specific targets in Tanzania places no legal pressure on firms to develop local expertise other than an intra-firm desire (if at all) to control the wage bill and appease political concerns if any. This defeats the purpose of producing skills because even when produced locals have limited prospects of practice. The perception is that this is limiting career progression of experienced Tanzanian personnel. A Tanzanian national employed by one of the mining firms remarked;

*'We (Tanzanian) can do some of the work they [expatriates] are doing, but we are ignored. May be it's because we don't speak good English.'* (Interview, February 2010).

On the other hand who is know if he is correct or the responded is underestimating his weaknesses.

Nevertheless there is all parties agree that there is a shortage of local skilled and experienced labour at all levels. To mitigate the current local skills deficits the GoT permits firms to engage skilled and experienced expatriates. As a result highly technical posts in the industry are largely held by expatriates. Observations at the visited mines, exploration firms and suppliers indicate that Tanzanian citizens are engaged in the engineering, exploration and purchasing departments but largely as junior staff following in-house training and development programmes.

The skills deficit in Tanzania has limited the opportunities of skills from the mining sector migrating to other sector of the economy. The general feeling was that the mining sector offered better wages compared to other sectors of the economy. In addition to limited opportunities in other sectors, the emigration of skills has limited the possibilities of skills migrating to other economic sectors. Instead the mining sector was drawing skills from other sectors. The most notable and acknowledged skills migration was the flow of logistics and purchasing skills moving from other sectors to the mining field. The general feeling was that the industry was still 'young' with less than 15 years post-liberalization large-scale private sector led mining experience. The feeling was that the industry first had to address local skills and experience deficits before spillovers could occur.

Instead of skills spilling over to other industries they tended to stay within the sector with experienced personnel establishing firms offering services to the sector. However even such occurrences were very limited. The study identified three such firms, all exploration firms, Zari Exploration, Gold finders and an unnamed firm

(referred to by the head of geology at the UDSM) as firms that were formed by the ex- mining firms' employees.

Freeman (1995) and Lundvall et al., (2003) show that economic development is not driven by merely having the adequate and appropriate skills and infrastructure. These authors argue that economic development is more the accumulation of knowledge through discoveries, inventions improvements, perfections and extortions of previous and current generations. Their work indicates that successful economies are characterized by complex integrated systems of new knowledge and innovation in productive economic activities and refer to these systems as National Systems of Innovation, (NSI).

*(iii) National systems of innovation*

It is accepted that innovation is one of the most important sources of competitive advantage and long-term economic growth in all countries. The NSI provides a useful analytical framework for assessing the drivers of innovation (OECD, 1997 and Habiyaemye, 2005).

The NSI assists countries and regions to develop strong capabilities through communication links between technology users and developers (as machinery, components and services). With this communication links *ceteris paribus* the developers of technologies grow their clientele and build good track records. A large clientele often gives rise to economies of scale that also in-turn allows the technology developers to offer competitive prices for their innovative products and services. Strong communication links also give birth to good back-up systems. Perhaps most importantly good communications links allow technology developers and users to overcome unforeseen shortcomings of existing technologies and also further innovations.

The Mineral Policy, 1997 suggests in Tanzania the government is aware of the importance of a functional NSI in efforts to generate high rent local mining sector linkages. The policy articulates a vision of establishing 'centres of technical excellence in various fields for capacity building, and setting up mechanisms for exchange of knowledge and experience' (Mineral Policy of Tanzania 1997:21). The policy acknowledges that government has a role in facilitating and promoting linkages among universities, colleges, research institutions and industry 'for the productive utilization of their inter-dependencies for mineral sector development' (Mineral Policy, 1997:28). This policy vision is coherent with the vision of the Tanzania Commission for Science and Technology (COSTECH) of coordinating science and technology research and application for the development of Tanzania perhaps indicating government's greater vision of a functional NSI. Evidence however indicates that this vision is yet to be implemented. First there are no centres of excellence to support the mining industry in Tanzania. The UDSM, the Madini Institute and the Moshi VETA Institute although offering mining sector specific courses, all have limited capacity to produce adequate skilled manpower. They also have limited research capacities and capabilities. There is very limited technologically advanced mining related research is conducted from within Tanzania. Neither the UDSM nor MEM could point out specific highly technical mining research. Instead they stated that local research was largely focused on lowly technical artisanal mining technologies. As a result the country had no mining related patents. The country is more concerned (and perhaps rightly so)

with generating adequate generic and sector specific skills. An exploration manager summarized the lack of coordinated efforts between the various sectors saying;

*'I don't see the enthusiasm of the University to make a follow up and get feedback from the industry.... People in the universities are expected to make greater contribution [to the sector] but were not there (yet).'* (Interview, January, 2009).

Second there is limited interaction between various sectors to bring to fruition the policy vision of an exchange of ideas. The most mentioned platform of interaction between universities and the mining sector was that of undergraduate students receiving training from the mines as part of the curriculum and the students conducting firm sponsored research projects as part of their final year undergraduate studies. An exploration manager with a mining firm referred to this interaction as *"minor and inadequate"*.

Evidence although limited also indicates that the vision is not apparent through other sectors critical for the development of local linkage. For instance a discussion with the MTIM indicated the ministry had no specific program for the mining sector. Also the countries industrial research body's website Tanzania Industrial Research and Development (TIRDO) body does not mention mining sector research and development of linkages in the sector<sup>21</sup>. It is a cause for concern that the MTIM, parent ministry of industrialisation efforts has no specific action plan to support the countries fastest growing sector. This lack of shared vision particularly in government departments is source of policy implementation challenges.

Setting up centres of technical excellence in various fields for capacity building, and setting up mechanisms for exchange of knowledge and experience demands adequate and reliable infrastructure. Without adequate and reliable soft and hard infrastructure efforts to establish these centres are both difficult and futile.

#### *(iv) Infrastructure*

A broad range of literature (e.g. Calderón and Servén, 2004 and, Canning and Pedroni 2004) concludes that there is a positive relationship between the stock of infrastructure assets and the rate of economic growth. The literature argues that the strongest growth impacts come from development of telecommunications, road and electricity networks. Work by Isard *et al.*, 1998 and Eggert, 2001 demonstrate this positive relation with reference to the mineral sector. The work argues that an adequate supply of infrastructure services is an essential ingredient for mineral sector driven economic growth.

Good infrastructure has a large bearing on the cost of doing business. The manufacturing industry needs adequate infrastructure to economically produce and distribute its output locally and externally. The poor state of infrastructure in Tanzania is extensively documented (see Africa Infrastructure Country Diagnostic (AICD) 2009; Mgwabati, 2010). The low level of both soft and hard infrastructure provision is constraining Tanzania's manufacturing capabilities. Miners and explorers stated that under the prevailing state of infrastructure manufacturing firms were reluctant to establish operations in the country.

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<sup>21</sup> <http://www.tirdo.org/projects.htm>. (Accessed 6 January, 2011)



The GoT recognizes the importance of developing infrastructure. The Mineral Policy (1997: 17) explicitly states a vision for a 'Well developed and reliable economic and social infrastructural facilities, such as transport; water supply; power supply; communication ...' (Mineral Policy of Tanzania, 1997:17).

Mining firms and explorers although noting and acknowledging 'massive' infrastructure delivery improvement over the past decade stated that inadequate, unreliable and poor infrastructure in Tanzania increased their operations cost. The firms stated that government had not delivered the promised infrastructure. As a result the firms stated that often they engaged in infrastructure development and maintenance projects such as maintaining roads and setting up power lines. The firms stated that these were expensive undertaking that were supposed to be government funded and implemented but they occasional engaged in to facilitate their own core operations. Mining firms' machinery and personnel were observed carrying out road maintenance work on some roads. In effect mining firms maintained sections of roads that this author observed were better maintained than state maintained sections.

Public sector officials pointed out two major reasons hindering the development of adequate and appropriate infrastructure. The first was the oft-mentioned reason of insufficient financial resources to develop and maintain adequate and reliable infrastructure. The second reason was political considerations hijacking economic objectives in infrastructure development projects. The concern of political needs superseding the economic need was corroborated by a consulting engineer. The engineer stated that at times infrastructure development programmes were dictated by political considerations which divert infrastructure project such as the building of roads and providing electricity to anchor projects such as mine were to providing the infrastructure to the electorate particularly in immediate pre-election periods.

Notwithstanding inadequate financial resources to simultaneously engage in a number of infrastructure development projects Tanzania needs formulate and implement coherent policies that will assist the development of adequate infrastructure that supports the growth local linkages. To develop appropriate infrastructure that will attract manufacturing investments calls for well coordinated and coherent programmes between the various government agencies at local and national level. Coherent plans and implementations are likely to result in reliable, adequate and well maintained roads, rail, telecommunications, water and sewerage facilities in the towns and cities and the remote mine site locations.

(v) *Regional determinants*

Despite Tanzania's rising status as a gold producer the country's economy has generally remained dependent on agriculture as the backbone of the economy, employing over 85% of the working population. Local productivity levels in mining linkages and other manufacturing sectors remain low with limited efforts at mobilizing domestic resources to promote robust and sustainable development. Mining industry contribution to Gross Domestic Product (GDP) estimated to be around 3.5% is a far cry from the government target of 10%.

The low levels of local linkages to the country's gold mining industry reflects Tanzania's proximity to regional economic powers in an era of globalization and free

trade. These economic powers have more developed capabilities to produce the majority of upstream and downstream inputs to Tanzania's mining industry value chain. These capabilities have been developed over a number of years leading to long established relationship with some of the mining firms operating in Tanzania. These mining firms exploit these relationships to source goods and services aided by continually declining transport costs. Furthermore the economies of scale of supplying local, regional and international markets reduce the incentive to set up linkage bases in Tanzania.

The regional challenge to developing linkages in Tanzania arises from four countries. First there is Kenya, a regional EAC economic power with a developing horticulture and food processing industry. The country is one of the main sources of processed food condiments and beverages with a market in Tanzania. In the mine canteens, Kenyan fruit juices and processed food are a common sight. Kenya has developed its food processing and horticulture to serve European and Middle East markets and has found a market in Tanzania.

Second there is Zimbabwe, a declining economic power with a mining history. A number of international mining firms had established operations in Zimbabwe prior to the economic and political turmoil there. Some of the firms have retained operations there but expanding their markets to a Tanzania a country 'catching up' with some of its neighbouring countries. An example of Zimbabwean sourced linkage was ground-based geophysical work by Geophysics GPR from Zimbabwe. In addition and despite economic challenges Zimbabwe still runs a School of Mines in Bulawayo and some of the graduates and experienced mining personnel are also engaged full-time or as contractors in Tanzania's mining sector.

Third, there is Zambia with a history in mining lying in its Copper mining industry. Some experienced skilled labour, trained in Zambia is now practising in Tanzania. In addition the mining related programmes at the CoTEC in the UDSM are reported to have been guided by programmes from Universities in Zambia (CoTEC respondent, 2010).

Fourth and finally South Africa, a country which has a developed mining sector as well as a developed supplier sector. The suppliers include both goods (capital equipment, spare and consumables) and a wide range of generic and specialist services. A large number of South African firms have had experience in operations in less developed countries north of its border (see Economic Commission for Africa, ECA, 2004). Interviewed purchasing managers stated that South African firms have built a reputation of being capable, adequately backed up and cost effective suppliers to remote and emerging mining zones in Southern and West Africa. This reputation has proven attractive to Tanzanian operations, coupled with efficient and cost effective logistic, goods and services from South Africa still land in Tanzania at competitive prices.

As long as Tanzania is committed to a liberal economy it will continue to face not only the challenge of these regional power-houses but also the traditional challenge of Western Europe, Australia, North America and China an emerging mining OEM supplier. Tanzania is a member of the EAC, SADC and the World Trade Organisation who members are committed to free trade with minimal non-tariff barrier and other

forms of protecting nascent home industries. Tanzania thus faces the challenge of finding policy space to champion the development a stronger and sustainable local manufacturing base capable of competing regionally and internationally. The question is how does the country face the challenge and what policies can be formulated to achieve this?

As if the challenge of developing local linkages in the presence of powerful regional and international economies is not steep, Tanzania also faces the challenge of effecting development programmes under conditions of good governance. Good governance manifests as security of tenure, property rights, and the rule of law and low levels of corruption. This study focuses on the corruption attribute in Tanzania because it a pressing and topical issue in the economic development discourse.

#### (v) Corruption

Transparency International (TI) measurements of global corruption levels indicate that corruption is rampant in Tanzania. From the period 2000 to 2010 Tanzania has consistently scored a low three out of ten on the TI Corruption Perception Index (CPI)<sup>22</sup>. Despite this, our study encountered no evidence of corruption in the mining sector in general and the large-scale gold mining sector in particular and in their linkages to local goods and service providers. This does not mean that corruption was not a constraining factor, but rather that we encountered no evidence of its significance. Both private and public sector players were reluctant to discuss the subject. Allegations of corruption in Tanzania were largely confined to ‘pub talk,’ and were directed at street level bureaucrats<sup>23</sup> on one hand and senior level bureaucrats and politicians on the other.

Allegations directed at street level bureaucrats singled out police officers and customs staff handling imported spares, machinery and consumables at the port. Police officers manning the road-blocks in the major roads were said to be demanding bribes from transport operators. This was said to be increasing the cost of logistics as transporters were factoring these charges on to their logistic charges. There were also allegations that importers often had to bribe customs department officials to speedily clear imported material adding to the cost of doing business in Tanzania. Khan and Gray (2009) describe this type of corruption as predatory corruption which is characterised by extortion and theft by public officials. If anything, by increasing the costs of imports, this type of petty corruption is an inducement to local sourcing. However because of limited capacity and capabilities the supply industry in Tanzania has not seized the opportunity.

Allegations against senior level bureaucrats and politicians were that this group was benefiting from the secrecy that surrounded operations in the sector. The secrecy around the mining development agreements (MDAs) and the freedom given to the Minister of Minerals and Energy to negotiate the agreements as stated in Section 10 of the 1998 Act fed the corruption rumour mill even without concrete evidence. The reluctance of the GoT to disclose the full details of the MDA and Section 21 of the

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<sup>22</sup> See

[http://stats.oecd.org/Index.aspx?DataSetCode=AEO\\_TAB21\\_CORRUPTION\\_PERCEPTION\\_INDEX](http://stats.oecd.org/Index.aspx?DataSetCode=AEO_TAB21_CORRUPTION_PERCEPTION_INDEX) (accessed 1 March 2011).

<sup>23</sup> Street-level bureaucracy is a public sector employee who actually performs the actions that implement laws.

1998 Act which criminalises disclosure of information obtained from a mining licence holder add fuel to this rumour mill. Despite concerns on Section 21 of the Act the Corruption Tracker<sup>24</sup> reports that provisions of this section are retained under Section 25 of the amended 2010 Act. The implications are that politicians, senior level bureaucrats, and private sector players have much to conceal, hence retention of the provisions. Legal developments in the USA (the Frank Wall Street Reform and Consumer Protection Act) that make it compulsory for all energy and mining companies registered with the US Stock Exchanges to disclose publicly not only what they pay to the US government, but also what is paid to foreign oil, gas and mineral producing countries like Tanzania are likely to reveal some details of the MDAs and revenue streams accruing to the host governments. A major point of interest will be the reaction of the host governments and the mining houses. In addition there are questions as to how Tanzania, a country that had previously and successfully resisted some aspects of Bretton Woods institutes policies so strongly that mediation caused these institutes to revise their mode of engagement with aid receiving countries, ended up with a weak mining act, the 1998 Act. Campbell (2009:1) argues that the effects of such acts in other parts of SSA as well is ‘...reducing (state) institutional capacity, as well as driving down norms and standards in areas of critical importance for social and economic development...’. Khan and Gray (2009) argue that weak state capacities deprive Tanzania and other like economies the best terms for a share of their mineral rents. In Tanzania the gold royalty rate is pegged at 3% Net Smelter Return<sup>25</sup>. The Tanzania Minerals Audit Agency TMAA (2009) shows that not only is the rate low compared to other countries such as Canada<sup>26</sup> with precious metals royalties pegged in the 10-18% of net profits interest range in all provinces and Botswana with royalties pegged at 5% of gross market value payable for all precious metals but also the royalty calculation approach is open to abuse and corruption. The TMAA points out that the Net Smelter Return approach could be depriving the country of additional revenue because the deductible allowable costs component of the approach is open to corrupt practices of inflating these costs.

Interestingly there were no corruption concerns raised about the issuing of prospecting, exploration and mining licence as favouring one group over the other. The only and consistent complaints were on the speed of processing these licences. The concern is that the process of legal compliance was lengthy. Khan and Gray (2009) argue that lengthy bureaucracies give rise to market- constraining corruption. In such situations civil servants may solicit bribes in return for speedy processing of licences and permits applications. Alternatively and simultaneously private sector players may also offer bribes in return for speedy processing of the same licences and permits applications.

## 7.0 Conclusions and recommendations

The impressive growth of large-scale gold mining activities in Tanzania has not generated the envisaged objectives. Local goods and service linkages remain limited and restricted to low complexity and low criticality goods and services. This is despite

<sup>24</sup> See- [www.corruptiontracker.or.tz](http://www.corruptiontracker.or.tz)

<sup>25</sup> The royalty is calculated as follows;  $\text{Royalty} = (\text{Royalty Rate}) \times (\text{Gross Revenue} - \text{Allowable Costs})$

<sup>26</sup> Royalties in Canadian provinces are as follows: Quebec 12%; Ontario 10%; British Columbia - 13%; Manitoba 18%; Yukon 13%; Nunavut 13%; NWT 13%; Saskatchewan 10% and Alberta 12%. Minimum tax in some provinces established through additional minimum taxes.

the country's mineral policy stating a vision of the mining sector contributing 10% of GDP and spurring the development of a mining services industry and manufacturing industry producing mining inputs. This study report draws two conclusions on policy as the major determinant of the nature and extent of linkages in the large-scale gold mining sector of Tanzania as follows;

(i) Cognisant of the lack of human capital and inadequate and reliable infrastructure this study concludes that the gap in developing and deepening local linkages to the country's large-scale gold mining sector is a reflection of failure to translate Vision 2025 into specific policies with the appropriate sanctions and incentives. The oft-cited reason for governments failure to take appropriate action even when faced with viable alternative options to deal with contentious issues has been the lack of 'political will' (Post *et al*, 2010). However, this appears not to be the case in Tanzania. Tanzania has formulated and modified its developmental policies as circumstances dictate. The transformation from the *Ujamaa* ideology to the current liberal economic policy regime spelt out in Vision 2025 demonstrates the will by the political elite to act. This will to act is demonstrated in the macro-policies such as Vision 2025 is also translated into meso-policies. Meso-policies such as the Mineral Policy of Tanzania, 1997 further demonstrate the will to translate grand policies to meso-policies. The deficit is the quality of translation from the macro level to the meso-level.

(iii) Notwithstanding intra and inter policies incoherencies, the report concludes that there is a policy implementation deficit. Whereas the sector has been liberalised to enable access to both local and foreign private enterprise, strategies to develop backward (and forward) linkages are yet to be fully implemented. The country has not produced adequate skills to services the sector and the manufacturing sector is yet to make the envisage inroads into the production of mining inputs. As a result, local linkages remain restricted to low rent supplies such as food, beverages and (some) camp management services.

This study concludes that policy implementation has been hindered by two factors. Firstly, Tanzania does not have the capacity to implement some of its policies. The most notable capacity is the financial capacity to built infrastructure, establish a strong NSI and support human capital development. Tanzania is highly dependent on external funding to implement some of its developmental goals and also often has to rely of external expertise. Dependency on external support for development is risky and implies progress is externally determined. The challenge is for the GoT to increase its revenue base and generate enough income to fund development projects or service loans taken to finance these projects. Secondly, some policies are highly ambiguous leading to implementation difficulties. Some of the objectives and strategies outlined in the Mineral Policy of Tanzania, 1997 can at best be said to be highly ambiguous. The policy does not define specific goals and the implementation means and actors in the defined strategies are not specified. Low policy specificity may be an indication of lack of capacity or a deliberate effort to avoid conflict. However, conflict on the policy goals in Tanzania is very low. Matland (1995) and Spector (1997) argue the implementation of such policies usually follows an experimental mode which opens the implementation arena to a wide array of interested participants. In such environments, policy outcomes are heavily dependent on the resources committed to implementation and the stakeholders that decide to participate in implementation. Participants' level of activity in implementation depends

on the intensity of their feelings about the policy, how the implementation impacts on the participants' other demands amongst a host of variables. There is thus a need to focus on developing a policy that has clear goals (as clear as a possible). The experimental mode provides rich experiences that Tanzania could use to modify its policies. However, in Tanzania the focus of the debate appears to have been captured by the issue of minerals royalties rate and the removal of certain import tax exemption as indicated in the draft Mineral Policy of Tanzania, 2009.

Although there are cases of inter and intra policy incoherencies in Tanzania this report concludes that the significance of these incoherencies is small compared to the gaps in translation and implementation of Vision 2025 as specific meso-policies with the appropriate sanctions and incentives. The past decades' debates on making the most out of Tanzania's minerals appear to be stuck on the level of royalties rate and creating 'investor-friendly' environments. Consequently this has led to competing countries offering more and more incentives to attract investment. The result has been a 'race to the bottom' with governments playing limited roles and realising increasingly less revenue from the sector in an environment of an increasingly dissatisfied and restless electorate advocating for government intervention. A number of SSA countries have gone through SAPs and have opened their markets to foreign and local private sector players. It is highly likely that some of these countries face the same challenges as Tanzania in their quest to integrate their resources sectors with the rest of the economy through developing sustainable linkages. This report concludes that stating clear and realistic policy objectives and implementing strategies to achieve these objectives with timely and appropriate policy adjustments whenever the need arises, is a major determinant of the nature and extent of linkages in a country's minerals commodities sector.

Governments in developing countries have often cited the lack of fiscal capability as a major reason underlining failure to implement policies. A study of fiscal policies directed at the development of basic social infrastructure, including education and technical skills, roads, power and water supply, telecommunication, and NSI in general, would be helpful to giving insight to this claim.

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