
Upgrading into Cutting and Polishing: Issues and Preliminary Project Outline

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Research Vision

- To make Tanzania a major diamond centre in the region through:
 - Upgrading
 - Downstream beneficiation
 - Side-stream beneficiation

Goal of the Research

- To find a global marketing solution for the mining community in the diamond sub sector based on the value chain methodology

Research Objectives

1. Identify the issues impacting Tanzania's benefit stream sharing from the global value chain
2. Integrate the actors in the diamond value chain
3. Evaluate the modalities for effective upgrading into diamond cutting and polishing in Tanzania.
4. Identify the critical tax issues impacting the diamond value chain in Tanzania

Parts of the Paper

1. Clarification of key concepts used
 - a. Value Chain
 - b. Upgrading
 - c. Beneficiation
 - d. Tax Yield
2. Report on Research Findings
 - a. Main Drivers in the value chain
 - b. The tripartite value chain map
 - c. Issues, intervention, sustainability and responsibility centres
3. Outline of the proposed cutting and polishing project

- **The Concept of Value Chain**

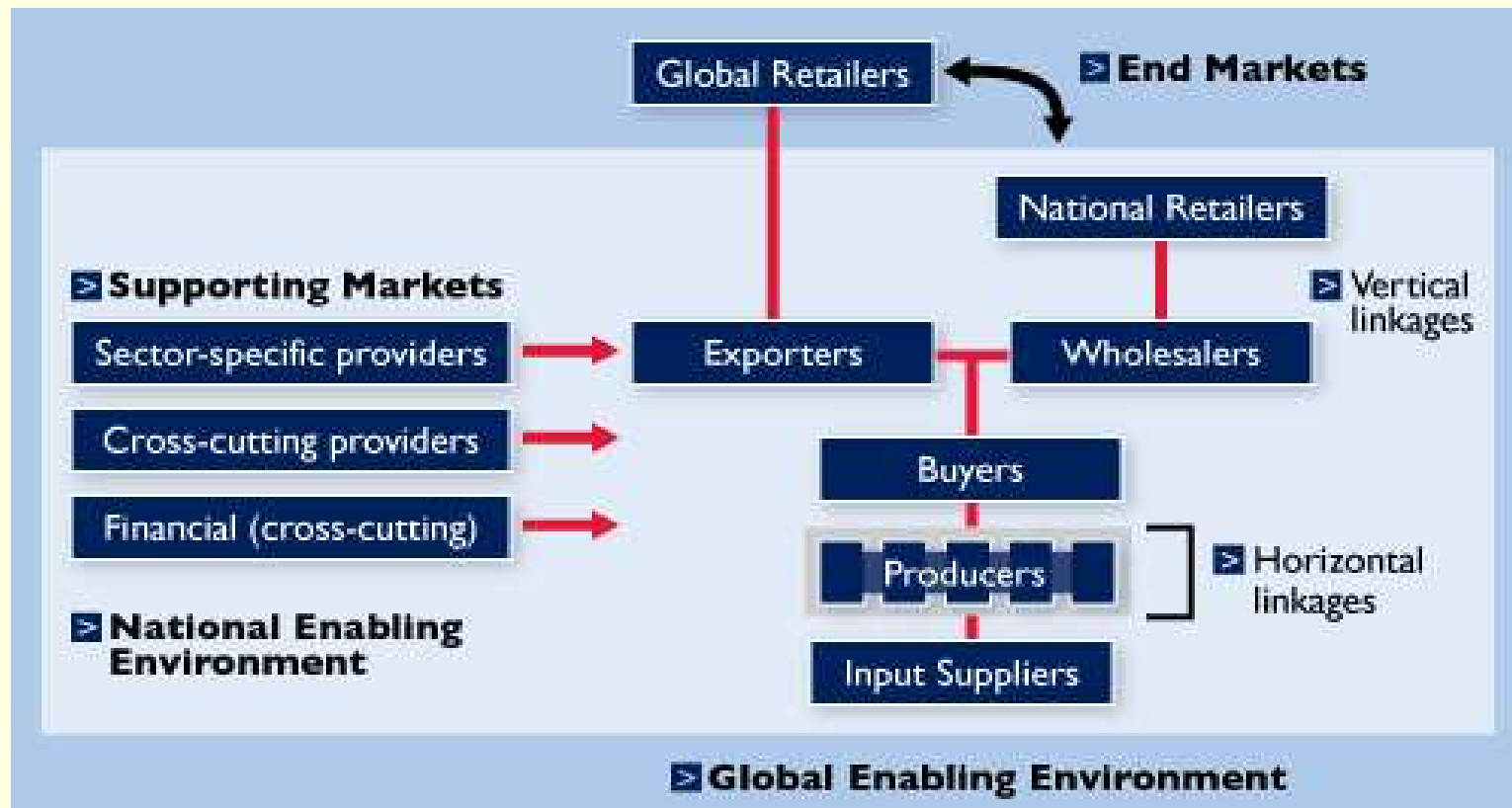
- The value chain is the full range of activities and services required from its conception to selling in the end market.

- Michael Porter defines it as core activities and support services required to deliver the product to the final consumer.

- PTO

1. Clarification of key concepts

■ Value Chain Concept



Upgrading

■ Value Chain Level

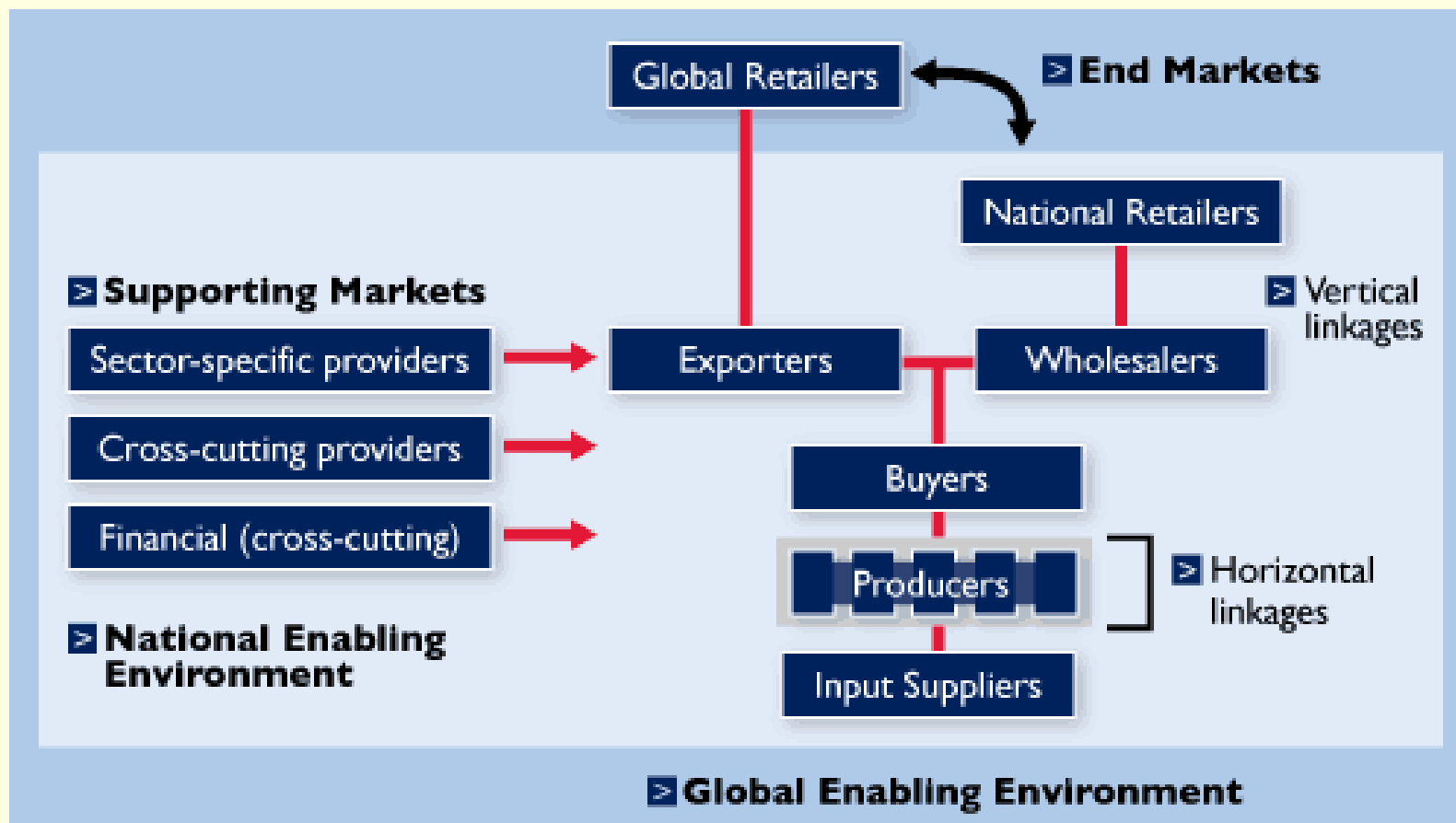
- Improving process
- Improving products
- Specializing in new functions
- Moving into new market channels

Upgrading

- **Firm Level Upgrading**

- Refers to the changes which firms in the same industry make to improve their competitiveness through process improvement, product quality, functional upgrading into higher value function, channels of distribution by entering new markets, new geographical areas – diversification and inter sectoral upgrading by entering a completely new industry

- PTO



Beneficiation

- The term beneficiation is based on the view that Africa is exporting all its minerals in “raw form” and that employment and extra revenues are forfeited to the advanced and developing countries that do all the processing.

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- “The term beneficiation, means contributing to the attainment of macro economic goals of :
 - Capital formation
 - Productive employment
 - Generating incomes (From direct, indirect and induced employment)
 - Stimulating the rise of support industries
 - Benefiting the local community

Side-stream Beneficiations

- Mining creates the “critical-mass” necessary for the establishment of other industries, such as stock markets, financial services, contracting services, heavy engineering, power, transport, manufacturing, etc.
- The multiplier effects of mining are so large as to generate an estimated doubling of the direct contribution of the sector to the economy.

Side-stream Beneficiations

- In countries such as Canada and Australia the side-stream beneficiation industries have been given due recognition and have been supported by their governments.
- Side-stream beneficiation requires more recognition in Tanzania.

WHAT ARE THE KEY DRIVERS OF MINING BENEFICIATION

- **Significant entrepreneurial base** looking at opportunities to service local and export markets
- **Competitive production**, high productivity, low costs vs competitors.
- **Craftsmanship and specific skills.**
- **Access to markets (domestic and foreign).** Most successful jewellery producers have started with a large domestic market.
- **Good market intelligence** (what customers want, the latest designs?)
- **PTO**

WHAT ARE THE KEY DRIVERS OF MINING BENEFICIATION

- **Low costs of doing business** (smart tape not red tape).
- **Low materials funding costs** (i.e. low interest rates).
- **Low tax rates**
- **Quality assurance** (Hallmarking) for final markets.
- **Research & development & innovation** incentives and capabilities.
- **Appropriate and competitively priced infrastructure.**

Tax Yield

- Is tax revenue as a ratio of GDP
- The yield for developing countries averages above 40%
- Sub Saharan Africa's average is 22%
- Tanzania's average is 13%
- There is therefore a need to widen the tax base and to ensure the multinationals, the large tax payers play to their tax responsibility

Target Group

- Artisanal/traditional miners
- Commercial small scale miners
- Commercial medium scale miners
- Large scale miners

Research Methods: (1) Field Visits

S/N	Institution	Purpose
1	MEM	Briefing on the policy, legal and regulatory framework of the mining sector
2	TRA	Data on exporters of diamond
3	External Board of Trade	Specifications in importing countries and organisations
4	BRELA	Shareholding of diamond sector companies
5	BOT	Up-to-date Export statistics

Research Methods: (1) Field Visits

S/N	Institution	Purpose
6	TIC	New registered investors in the sector
7	STAMICO	Their experience with TANCUT
8	SEAMIC	Whether they had a curriculum for training diamond cutters and polishers
9	BRELA	Shareholding of diamond sector companies

Research Methods: (1) Field Visits

S/N	Institution	Purpose
	ZONAL MINING OFFICER - Shinyanga	Profiling and statistics
	ZONAL MINING OFFICER - Arusha	Gain experiences of tanzanite industry for comparison
	SMALL SCALE MINERS IN - Shinyanga	Clarify issues of concern to this group

RURAL RAPID APPRAISAL METHOD

- Met brokers and dealers in Mwandui and Maganzo.

OTHER METHODS

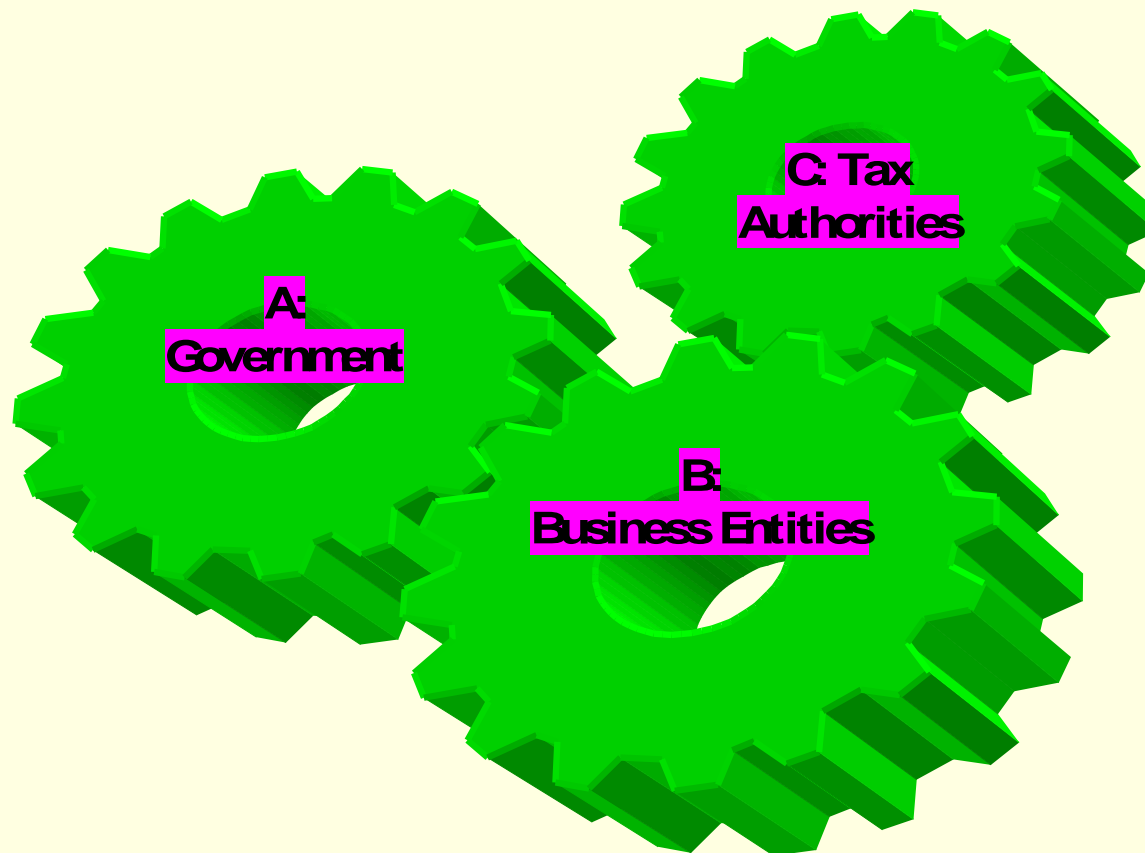
- Desk research, internet search,

FINDINGS

- Key Players in the sub sector:
 - The Government
 - Business entities
 - Tax Authorities, as shown below.

FINDINGS

- Key Players in the sub sector



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- Roles of the actors in the Chain were identified

The Role of Govt.

- Sets the policy responding to developments in the national and global business environment changes
- Puts in place the enabling legal, institutional and regulatory frameworks
- Promotion of investments, production and exports
- Liaises with stakeholders
- Sets standards and supervises safety and environmental compliance
- Capacity building, especially for small-scale miners

Role of the Mining Community

- Responding to opportunities made possible by the enabling business environment
- Mobilisation of local and foreign savings in the mining sector
- Mineral exploration
- Research and development
- Comply with laws, regulations and especially the Extractive Industry Transparency Initiative (EITI)

The Role of Tax Authorities

- Tax education of the miners
- Fair and efficient tax administration
- Simplification of tax codes and documentation
- Achieve optimum tax yield from the sector
- Giving fair hearing to miners tax appeals

The Tripartite Value Chain

- Mining Development Value Chain
- The Business sector value (Formal and informal sectors)
- Tax value chain (Input, process and output taxes)

Core Actors on the Development Value Chain

- Ministry of Minerals and Energy (MEM),
- Attorney General Chambers (AG) –
- Ministry of Finance (MoF),
- Ministry of Lands & Human Settlement (MoL),
- National Environment Authority (NEMA)
- Tanzania Investment Centre (TIC)
- Representatives of local mining communities such as:
 - The Tanzania Chamber of Mines (TCM);
 - The Tanzania Women Miners Association (TAWOMA); and
 - Various Regional Mining Associations (REMAs)

Core Actors on the Formal Business Value Chain

- Multinational diamond mining companies
- Large-scale miners
- Formal SMEs mining companies
- Service providers
- International and local financial institutions

Core Actors on the Informal Business Value Chain

- The ASM:
- Traditional miners
- Small-scale miners
- Pit financiers
- Brokers
- Dealers

1. Salient Issues in Development Chain

- Lack of well defined programmes, strategies and action plans for alleviating poverty among artisanal and small scale miners (ASMs) in the
- Low wage rates and benefits for Tanzanians working in the diamond mines.

1. Salient Issues in Development Chain

- Falsification of mine output figures and values in order to minimise royalty and tax payments
- Limited domestic value added in the diamond industry
- Land conflict in diamond mining areas
- Poor compensation of local communities evicted from large scale diamond mining sites

1. Salient Issues in Development Chain

- Limited Tanzania Government equity participation in diamond mining ventures
- Limited exploitation of the diamond potential in Tanzania
- Reluctance of mining firms to pay the annual US\$ 200,000 to local authorities
- Widespread illegal mining by the ASM's
Environment degradation in diamond mining areas

2. Salient Issues in Business Value Chain

- Abuse of investment incentives issued by the Tanzania Investment Centre (TIC)
- Unaffordable Reconnaissance License Fees to local entrepreneurs. License preparation fee is US\$250, annual rent is US\$10/km² and renewal fee is US\$200.
- Invasion and eviction of artisanal and small scale diamond mining sites by medium local companies and large multinational mining companies. This has occurred at Mabuki Mwanza diamond mining sites and the miners are very disappointed

2. Salient Issues in Business Value Chain

- Domination of large diamond mining in Tanzania by De Beers. De Beers Investments owns 75% of Williamson while Williamson owns 100% of new Almasi Mines, all at Mwadui, Shinyanga
- Low value added in rough diamond production and exports.

3. Salient Issues in ASM Value Chain

- Lack of skills and equipment
- Allocation of explored areas by government.
- Training in traditional diamond prospecting and soil skills
- Provision of basic equipment.

3. Salient Issues in ASM Value Chain

- Licensing, lack of mining plots, thefts, lack of food, poor roads, environmental degradation, finance, technology, tax avoidance
- Licensing, allocation of mining plots, security of allocated mining plots, credit facility and organisation of SACCOs, supply credit for mining implements, agriculture extension services, partnerships with large-scale miners, reduced royalty rates.

3. Salient Issues in ASM Value Chain

- Lack of processing and testing equipment, Water shortage, Lack of knowledge of prices, lack of processing knowledge, quality control.
- Availability of testing & processing equipment on hire arrangement, Installation of water supply system, training in quality standards and client needs Dealership & brokerage licensing, thefts, finance, testing equipment and ICT facilities, lack of knowledge of consumer demands and prices, tax avoidance

4. Salient Issues in Tax Value Chain

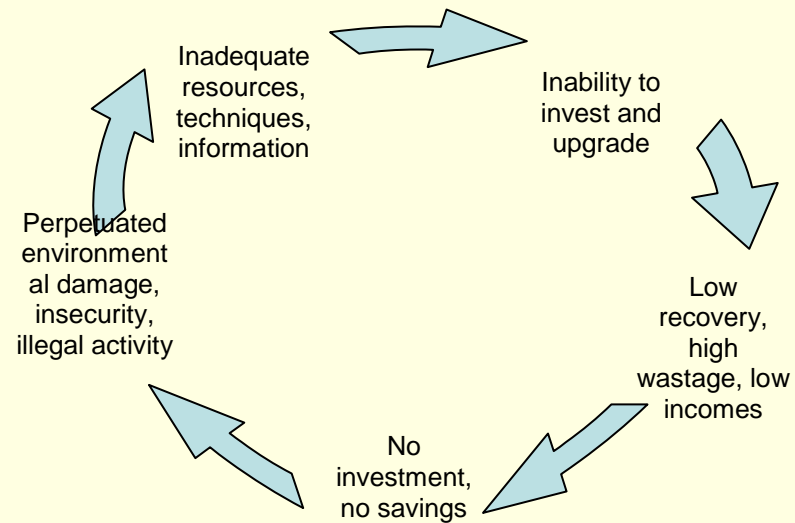
- Tax evasion through transfer pricing by both the foreign and local miners
- Falsification of mine output figures and values in order to minimise royalty and tax payments

4. Salient Issues in Tax Value Chain

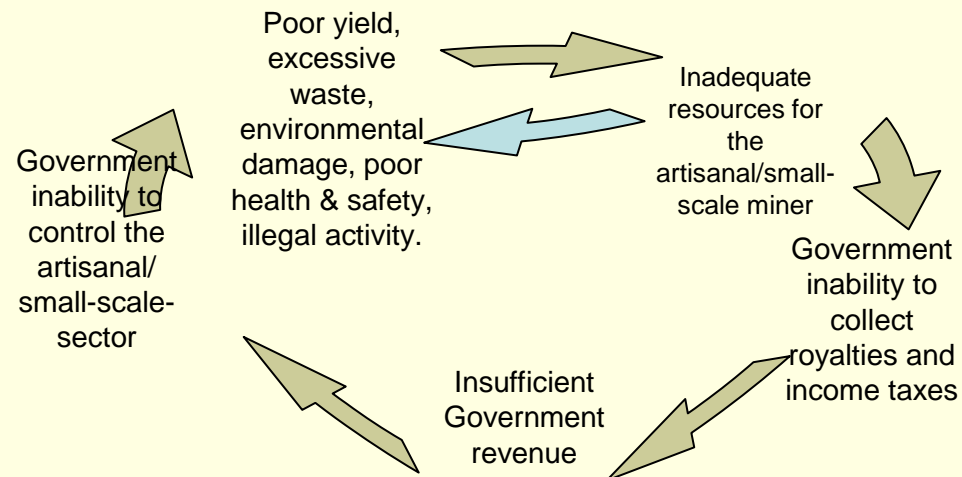
- Limited domestic value added in the diamond industry means less taxes to Government
- Reluctance of mining firms to pay the annual US\$ 200,000 to local authorities
- Widespread illegal mining by the ASM's limits the tax base

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- Both negative cycles must be broken to overcome constraints on artisanal mining as seen below.

Vicious Circle of the Small-scale Miners



Vicious Circle of the Mining Authorities



Required Interventions

- **legalising small scale mining,**
- **availing soft loans and**
- **organising the marketing of rough diamonds together appear to be the strategies for a long-term solution for the small-scale diamond miners.**
- **This is only possible through partnership of the stakeholders.**
- Upgrading will ensure a fair market for the small scale miners, which can be reinvested in personal upgrading through improved standard of living, acquisition of appropriate technology and enhancement of skills.



■ The Proposed Project

1. Project Aim/Goals: The Strategic Intent of the Project

- The major aim of the proposed project is the downstream upgrading of the diamond industry through export of processed and branded diamond products to enhance the value addition of the diamond value chain in Tanzania.
- Currently Tanzania exports only rough diamonds, without much value added beyond the preliminary sorting at the mine gate.
- Given that Africa produces more than 60% of the diamond rough and given Tanzania's 12th position among the world producers, it has become imperative for the nation to plan for beneficiation for the benefit of its peoples.

2. Project Vision and Mission

- The project **vision** is to build capacity for domestic beneficiation to enable Tanzania acquire a significant value-added share of the global diamond trade and improve the incomes of the diamond communities in the country within the next five years.

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- The **mission** is to develop capacity for domestic value addition through sorting, valuation, cutting and polishing and develop trade ties with the external jewellery market for sustainable export trade business.

3. Development objectives

- To promote value addition in the diamond value chain in the country and increase employment and household incomes in order enhance regional economic development for Shinyanga, Mwanza and regions.
- To contribute to the sustainable mineral development strategy by reaching the global markets and improving the competitiveness of the country's mineral supply, through a private sector initiative.
- Increase the contribution of the diamond sector to the country's GDP and Tax yield.

3. Development objectives

- Increase the opportunities for the Artisanal and small-scale diamond miners to integrate into the formal mining value chain.
- To promote the idea of a Dar es Salaam Mineral Exchange in which the mining community in the country can participate fully and promote the Tanzanian mineral brands.
- To perform on the resolutions of the African Diamond Producers Association (ADPA) of enhancing beneficiation on the African continent.

4. Specific objectives

- To sort, cut and polish 25,000 carats a year in the short-term and in the long-term, process all the diamonds produced and imported before exporting out of the country.
- To expand the diamond trade beyond the traditional markets into China, Asia and the Middle East.
- To develop institutional and human resource capacity in cutting and polishing and enable Tanzania to compete effectively in the export market.

5. Key Project Assumptions

- The enactment of a Diamond Act to regulate the diamond mining, processing and trade and incentives put in place to motivate the current exporters of the rough to sell to the plant.
- More exploration of diamonds so that new and more productive mines can be opened to augment the current production capacity.
- That large players like Petra Diamonds and Lev Leviev can take interest in the proposed venture and benefit

6. Project Institutional Framework

- The following project institutional framework is proposed:

6.1: Project sponsors

- The pilot project will be promoted on a *private public partnership* to set the pace for the national industry.
- Once the project takes off and the necessary capacity is developed in the country, subsequent enterprises will be developed on a private basis, as business to business through mergers and acquisitions, with the Government playing the role of providing the enabling environment, in line with the national mining policy.

6.1: Project sponsors

- The private public partnership will operate on a 50/50 ownership between the Governments of the United Republic of Tanzania and a large scale sponsor, with a capital of US\$ 10 million, structured as US\$ 5 million equity and US\$ 5 million loan capital and with the government contributing US\$ 2.5 million and the private investor US\$ 2.5 million.

6.2: Project Supervising Agencies

- The project will be supervised by an independent Board of directors similar to Namdeb of Namibia and Debswana of Botswana.

6.3: Project implementing Agencies

- A new independent company (like NamGem) will be created to run the enterprise.

6.4: Regulatory Agency

- The State Mining Corporation (STAMICO) will be the regulating agency with the sole responsibility of promoting the enterprise and creating the enabling environment for the diamond industry.

6.4.1: The Role of STAMICO

1. **Advisory Role to Government:**

- The main role is to facilitate better interaction between the diamond industry and Government.
- The Corporation would advise government on the necessary policies and regulation to promote high productivity in diamond processing including;
 - incentives to attract small-scale enterprises to enter the sector at a regulated scale to control productivity and quality,
 - simplify business licensing procedures,
 - set products and labour market standards and
 - assist in directing the export/import policy development for the sector.

2. Trade Facilitator

- STAMICO's role as trade facilitator will be to coordinate the scattered efforts of the individual miners, exporters and jewellery makers to make the mining industry a powerful engine of Tanzania export sector growth.

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- The Corporation would undertake promotional activities;
 - Organising international mineral shows, arranging trade delegations,
 - Advertising internally and abroad, develop trade publications,
 - Arrange for twinning arrangements between countries for the supply of the rough, communicate with embassies, trade bodies all over the world,
 - Organise seminars, buyer-seller symposiums and provide market information to the industry participants regarding trade inquiries, trade and tariff regulations, import duties and gem fairs and exhibitions.

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- Secure adequate supply of the rough to the industry through properly designed procurement systems from the mines.
 - Encourage and oversee partnerships with jewellery manufacturers like watch manufacturers that use low-end diamonds in order to secure sales.

3. Information and Media Centre

- The Corporation will maintain a data base of the diamond processors. Publish trade directories and magazines to be distributed to its members and internationally.

4. **Management of the Diamond Industrial Park (DIP)**

- STAMICO will develop and manage the *Diamond Industrial Park (DIP)*, (similar to the DIP of Surat) as a market place and B2B labour sub contracting to small firms and individual cutters.

5. Training and Research

- STAMICO will arrange for skills development through formal training of the diamond cutters, both locally in collaboration with other capacity building institutions like Southern and East African Mineral Centre and internationally in order for the industry to benefit from technology transfer.

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- Invest in research and development to support local innovation through which a market niche can be developed.

6.5: Project coordinating agencies

- The Company's Board of Directors will play the coordinating role.
- The Board will have a minimum of 8 members with four members representing government, preferably from STAMICO, Ministry of Energy and Minerals, Bank of Tanzania and the Chamber of Mines to ensure that the company activities are well aligned with the national sustainable mineral development policy;
- The other four to represent the private investor.
- The Ministry will directly implement the Kimberly Process Certification (KPC) Scheme to ensure compliance to the scheme and to protect the local industry.

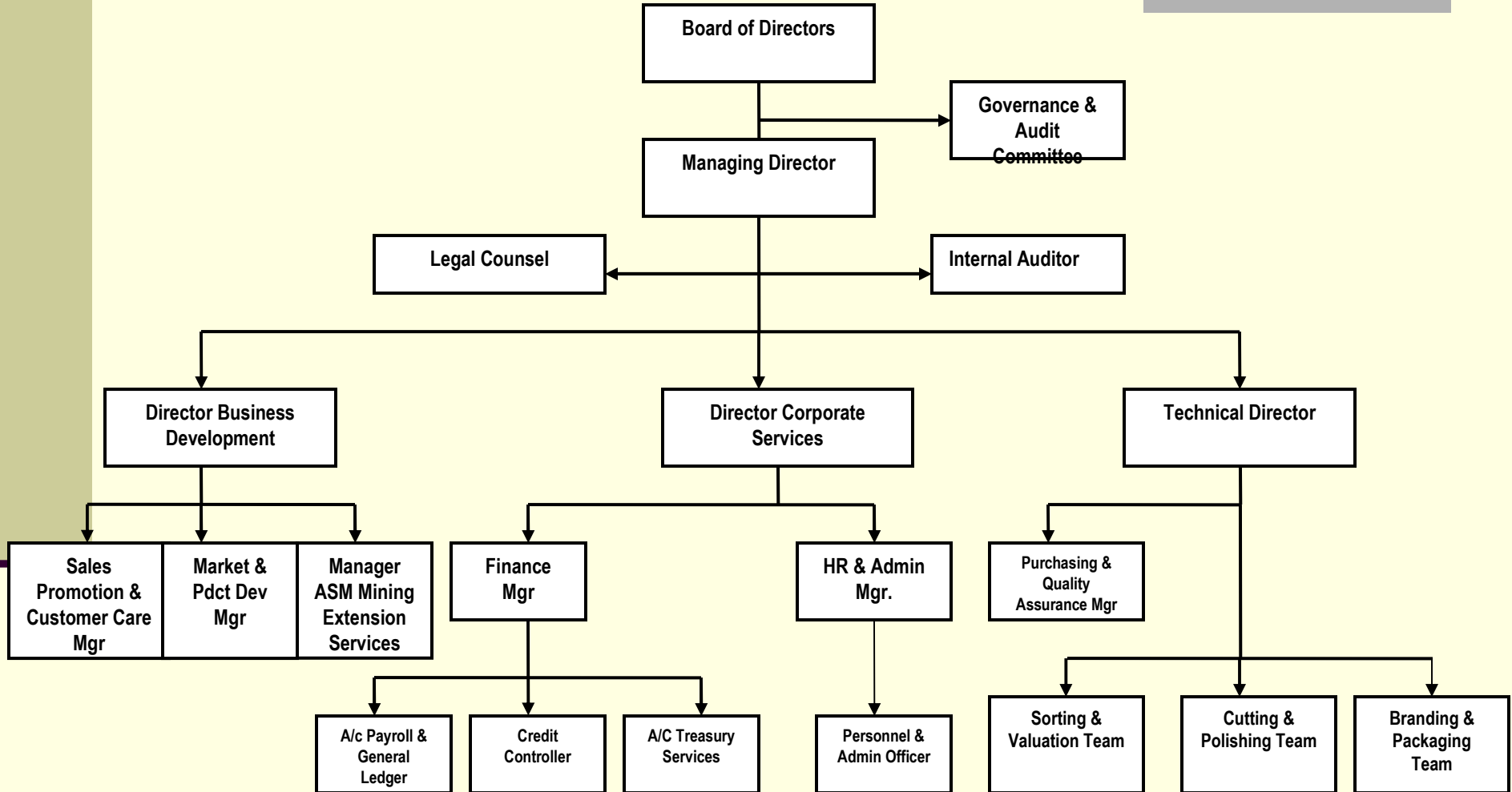
7: Corporate Structure

- Corporate Governance (CG) is directed towards fulfilment of organizational obligations to its stakeholders through proper accountability and efficiency.
- In this vein, the project will have a Governing Board with representatives from the Ministry of Energy, Chamber of Energy and Mines, STAMICO, the Bank of Tanzania and the representatives of the private investor, with its Managing Director as ex-official member of the Board.
- The Board would develop the policies to govern the project and the powers, functions, duties and composition of the Board and the project Directors and functional heads and Committees.

7.2: Project Management Structure

- The project management structure is summarised in **Figure** below.

Figure 9.1: PROPOSED PROJECT MANAGEMENT STRUCTURE



7.3: Project Reporting

- It is important for all stakeholders to be informed about the activities and progress made by the project.
- In addition to the statutory reports (Final Accounts, Annual Reports, Management Reports to the Board), a *Quarterly Newsletter* will be produced and given wide circulation and should include environmental, corporate social responsibility and governance issues.

8: Type of Project

- In terms of structure, the project has several options.
- **At the macro/large scale level** the options include:
 - Public private partnership (PPP between govt. and large scale mining companies)
 - Private and Private (PP) – cooperation between experienced companies through mergers and acquisition
 - Initial Public Share Offer – Private company converting to a public company

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- **At micro level, the option is Business-to-Business (B2B)** – between two locals with different capacities
 - Or one local and one foreign coordinated by foreign governments are development agencies e.g. Danida, China Africa Council or Sullivan for USA.

9: The Proposed Cutting and Polishing Plant

- This project concept is an outcome of several informal and official consultations and experience sharing between the diamond miners and officials in mining and the business community both in Dar es Salaam and Shinyanga region.

The Project Concept

1. Project Capacity

- This pilot plant proposed is a medium size plant processing 25,000 carats per year, representing 9% to 10% of the average total diamond rough recovered in the country annually (270,424 carats average for last 5 years)
- The major limiting factor in cutting and polishing is the availability of the rough and this was used to determine the capacity of the plant.

1. Project Capacity

- It is assumed that the plant will process diamonds from the external sources as well.
- From official trade statistics, Tanzania exports carats in excess of the recovery and some of this could be directed to the plant during the lean periods.
- This has implication for policy, to ensure that adequate rough is availed to the project.

2: The Market

- While the traditional markets of New York, Antwerp and Mumbai are being affected by the financial slowdown, the upcoming markets of China and Dubai can absorb the projected output.
- Dubai, with one of the largest commodity exchange in the world today is targeted as a possible market for the project.

2: The Market

- Currently, Tanzania is exporting a substantial amount of rough and industrial diamonds to several countries
- This means that there are already trade ties and experience with these countries.
- To ensure a stable market for the product two strategies need to be put in place, namely;
 - Joint partnership and
 - Branding.

3: Joint partnership

- Since Tanzania is new in the processed diamond markets it is imperative for the project to join hands with a partner renowned in the jewellery business, the likes of Lev Leviev, Tiffany, Winston etc,

4: Branding

- It is important for Tanzania to brand their polished diamonds for trust building and certification of country of origin

4: Branding

- The creation of a brand market may be important to the establishment of a diamond manufacturing industry in Tanzania.
- The development of “African” diamonds could provide an opportunity for a niche market.
- The polished diamonds sold under a Tanzania brand could be marketed domestically for the tourist industry, and through tourism to the United States, the world’s largest diamond jewellery market.

5: Human Resource Requirements

- For a cutting and polishing plant of 25000 carats per year and highly automated will require 20 persons

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- 1 Manager/Marker
 - 1 Supervisor
 - 2 Sawyer
 - 2 table Polisher
 - 2 automatic bruter
 - 2 bruter/fixer
 - 2. automatic blocker
 - 2 automatic polisher - top and bottom
 - 2 fixer for polishing
 - 2 polisher for halves
 - 2 polisher for stars

-
- In order to compete on the basis of quality, productivity and cost, the project will have to invest on training of personnel, preferably on an industrial attachment basis, which is relatively less costly.

6: Machinery Requirement

- Sawing Machine
- Automatic bruiting machine
- Computer
- Safes and office equipment
- Polishing machine
- Laser cutting machine
- Balancing machine
- Scouring machine
- Spindle bench
- Press pots (for holding diamonds)
- Estimated cost US\$ 437,710

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- Diamond manufacturing is similar to many other industries where new technologies have been developed in order to compete with low-wage economies.
 - Belgium and Israel, with De Beers, have taken the lead in developing this technology, which is used in different cutting centres for
 - Improved quality and productivity

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- Using the new technology, it is now possible for a new manufacturer to become competitive in a relatively short period of time.
 - The net result is increased capital costs and reduced labour requirements.
 - Most manufacturers agree that technology and automation are key to developing an industry in a relatively high labour-cost country.
 - However, they also assert that currently available technology is only appropriate for certain sizes and qualities of stones and, in many cases, cannot replace the eye of an experienced cutter

7: Land and Building Requirement

- It is proposed that the project be located in Mwanza where facilities are more developed than Shinyanga in order to reduce the cost of “doing business”.
- An acre of land will be required for the project at a projected cost of US \$ 10,000.
- The cost of land and the building is estimated at US\$ 40,000

8: Capital Investment for Establishing the Cutting and Polishing Plant

- Total capital Investment is estimated at **US\$ 1, 902, 710**
- **Approximately 60% is working capital**

9: Project Profitability

- The assumptions made in arriving at the values projected were based on information provided by De Beers to the Canadian Federal Territorial Committee on Value Added Aspects of the Canadian Diamond Industry.
- According to De Beers for every US\$ 20 diamond entering the cutting and polishing plant the components costs are as follows:
 - US\$1.00 – Financing costs: based upon the diamond being three months in production and two months awaiting cash receipt from sales,

9: Project Profitability

- US\$2.10 – Direct costs: associated with labour and consumable costs at the factory floor,
- US\$0.70 – Overhead costs: management, supervisory, security, personnel, maintenance, and depreciation costs,
- US\$0.60 – Administration costs: associated with the sorting and transport of the diamonds, and
- US\$0.80 – Profit: attributed on the basis of a 3-4 percent norm for the industry when processing small sizes in large volumes.

9: Project Profitability

- According to *WWW international diamond Consultants*:
- About 55% of the weight is lost during the polishing process.
- Labour costs must be 10% below the value of the rough in order to make a profit
- Using South Africa as a basis of the calculations, other costs were estimated as follows:
 - US\$ 35/ct to US\$ 40/ct –direct labour costs
 - US\$ 10/ct to US\$ 15/ct - all other costs (administrative, security, and other overheads)

9: Project Profitability

- For 25 polishers, 2000 cts of the rough would be required per month for diamonds averaging US\$ 600. Since the factory will be processing various sizes stones, the figure was estimated at 25,000 carats per year.
- The projected profitability was estimated at 11% before tax

10: Key Success Factors

- The availability of the rough in the right quantities, quality and at the right price.
- The quality of the polished diamond depends to a large extent on the quality, and size of the rough.

10: Key Success Factors

- The expertise of the cutters and their level of motivation and integrity.
- Expertise is gained with experience and the level of motivation to perfect the art.
- Theft of the stones may collapse the business. Although security systems are now well advanced, the ultimate security is the integrity of the worker, who can overcome any security system in place.

10: Key Success Factors

- Availability of steady contracts with the buyers.

11. Business Challenges

- Diamond processing expertise is yet to be developed in Tanzania.
- Although capacity can be acquired very quickly given that majority of the population are trained in processing other gems, it may take quite sometime to reach the required international standards.
- Several policies and incentives will be required to support the industry.

Other Challenges

- Continuous access to suitable and affordable rough to local industry
- Creating enabling financial environment and improving cash flow
- Improved productivity of cutting and polishing and gemstone jewellery industry labour, management, production process, technology

Other Challenges

- Accelerated development of advanced cutting, setting and jewellery manufacturing skills
- International producer country (in particular SADC) cooperation and value addition strategy

How Do We Move From Here?

- A Comprehensive feasibility study to be carried out and financed by Government
- This should involve benchmarking with countries like Botswana, South Africa, Belgium, India and China
- The appraisal report will be the base instrument for marketing the project to possible partners.
- RTA and ESAMI is ready to provide consultancy back-up support

Group Work

- Draw the attention of the delegates to the group topics at the end of the programme.

■ I thank you for your
Kind Attention!