Mineral Exploration as Business: Global Practices and Indian Challenges – *Amit Tripathi, Director, MPXG Exploration Pvt Ltd, Hyderabad.* (*E: amit.tripathi@geoexplorationllc.com*)

Mineral Value Chain

Objective of business is to make profit for shareholders. Transforming a raw material to product and selling it for profit is a business activity. From the business perspective exploration is not only to find mineral in ground but to identify all potential factors that may potentially hinder the future mining and mitigate those risk factors. The *Mineral Industry* value chain starts with a greenfield reconnaissance concession as its primary raw material. Value is added to the primary raw material through geological work and it progresses through the stages of prospecting, exploration, feasibility, mining, processing and mineral based industries. The value of the tenement progressively increases with every de-risking activity. Objective is to systematically address all potential risks to a feasible mine and provide a fully de-risked property for mining. Moving up the value chain the business gets low risk and large size. Mineral based industries, for example metallurgical plants or refineries tend to be of the order of thousands of crores of rupees, mining industries tend to be of the order of hundreds of crores and exploration is of the size of tens of crores. It is a normal tendency for the larger downstream industry to expand and secure CAPTIVE supplies and, commensurate with their size, they often have disproportionately larger influence over policy and regulatory bodies. As a corollary, the larger industries are often fully de-risked and highest risk is taken at the greenfield exploration stage.

Scope of Exploration Business

The early stage part of the mineral industry value chain from greenfield prospecting to feasibility is the space where exploration businesses operate. There are generative businesses at lower end of this chain that specialize in early stage project identification. Then there are exploration businesses that develop these projects through surface exploration and preliminary drilling to target identification. And finally there are advanced explores that complete detailed drilling, beneficiation tests, economic analysis and feasibility. These are broad zones with some companies specializing into one activity and some having broader scope.

Primary raw material for this exploration value chain is an exploration tenement and the final product is a feasible fully permitted mining lease which in turn becomes raw material for the miner. As their projects progress, explorers raise finance through innovative tools like discounted valuation, warrants, options, private equity placements, share sales, joint ventures, pledging future production, forward selling property etc. This finance is primarily used to further the project de-risking. Every round of financing is done at progressively higher valuation as the exploration work adds value to the tenement and consequently accrues capital gains to the owners of the shares of the explorer. As the explorer keeps declaring good results and moving towards feasibility the value of their company shares can rise multifold in a very short time (Table 1). Early investors stand to gain multiple times their investment in successful projects sometimes over 500% in one year. Some examples of successful projects of last two years are given in Table 1. The great success of this model in last 25 years has encouraged several global major mining groups to pare down their in-house exploration teams and focus on acquisition of advancing exploration businesses suitable to their needs. Explorers make profit through progressively increasing valuations and sale plus royalty (full or partial) of the value-added tenement to miners.

The high risk – high reward business of exploration attracts large amount of risk capital. Specialized private individuals, private equity firms, institutional investors and general public who understand the business are primary source of exploration financing. Mining funds, mining companies and some banks also deploy a portion of their funds in exploration equity. The exploration value chain is almost exclusively funded through equity participation.

Being a niche business activity, the exploration business (also referred to as junior mining business) thrives in a conducive regulatory environment. Several jurisdictions have created unique laws and rules that facilitate and nurture the exploration business and have successfully created a large industrial ecosystem around it. This ecosystem includes generative businesses that identify and acquire potential properties; topographic, geological and geophysical survey businesses; drilling companies; assay labs; resource modelling companies; metallurgical testing labs; legal and financial service companies; brokers and market specialists; public relations firms etc. Hallmark of a jurisdiction conducive to growth of exploration business are free and easy acquisition and trading of mineral rights, freedom to innovate and use innovative technological, financial and marketing tools and freedom to sell mining rights to make profits. The legal framework of social and environmental responsibility is accepted and respected by the exploration industry globally.

Table 1. Some recent examples of annual valuation growth in exploration projects

One year period	Company Name	Valuation change
Oct-2017 to Sep-2018	Pacton Resources	700%
Jan-2019 to Dec-2019	Amex Exploration	452%
Oct-2017 to Sep-2018	Evrim Resources	408%
Oct-2017 to Sep-2018	Oroco Resources	380%
Jan-2019 to Dec-2019	K92 Mining	206%
Jan-2019 to Dec-2019	Royal Road Minerals	186%
Jan-2019 to Dec-2019	Mineral Mountain Resources	180%

Current Indian Scenario

Current mineral economic outlook is extremely bleak. Mine production is declining, exports are down, mineral imports are rising (Table 2). The raw material availability for the industrial base is progressively shrinking. Other than increasing cost and forex drain this causes a strategic vulnerability as the industrial base becomes more import dependent. Especially critical are the rare earth elements over which China has a significant monopoly. China demonstrated its intent and willingness to use this monopoly for its strategic and political goals when it stopped supply to Japan in 2010 over a dispute and sent shock waves through Japanese electronics and defense industries. Recently the US presidential reference directed the Pentagon to secure rare earth metals for its defense and strategic requirements.

With rising prices of gold (projected to strengthen to $1600-1700/oz) and steady import of ~950t/y, imports of the yellow metal are set to make a major dent (estimated around $40-50 Billion) in India's

Table 2. Comparison of import and export growth of selected commodities

Export (in Cr Rupees)	2016-17	2017-18	Δ %
Iron ore	Rs.10,292.93	Rs.9,490.14	-7.8
Granite	Rs.9,336.86	Rs.9,248.51	-0.95
Copper and alloys	Rs.105.43	Rs.380.55	260.94
Bauxite	Rs.510.53	Rs.270.50	-47.02
Chromite	Rs.365.77	Rs.174.30	-52.35
Other	Rs.774.29	Rs.541.57	-30.06
Import (in Cr Rupees)	2016-17	2017-18	Δ %
Copper ore & conc	Rs.18,298.70	Rs.27,834.48	52.11
Manganese ore	Rs.2,402.81	Rs.5,063.40	110.73
Iron ore	Rs.2,161.52	Rs.4,229.40	95.67
Gypsum	Rs.605.11	Rs.825.42	36.41
Molybdenum ore and conc	Rs.544.25	Rs.814.95	49.74
Zirconium ore	Rs.456.90	Rs.620.27	35.76
Magnesite	Rs.308.99	Rs.526.87	70.51
Dolomite	Rs.299.97	Rs.536.25	78.77

Source IBM Mineral yearbook 2018 vol I

forex reserve in 2020. Government has already started preventive steps of banning imports and hopefully these steps would have the desired effect.

Liberalization Period

Indian mining industry was liberalized in 1992-1993, a flood of major and minor exploration business started germinating. Some of the explorers tasted success but the industry fizzled out by 1998. By the turn of the century almost all had closed shop. A few companies like Deccan Gold and Geomysore are still persevering and are bravely negotiating the headwinds.

Regulatory Perspective

Mineral exploration being a high-risk business needs its unique regulatory consideration. A very important thing to appreciate is that exploration business is NOT mining business and requires its distinct and unique set of laws and rules to be able to flourish. With a conducive regulatory environment exploration has a potential to significantly contribute to the country's economy, rural employment, strategic security, and comfortable industrial base.

Mineral Exploration flourishes as an enterprise in a regulatory substrate where high risk is rewarded with promise of windfall profits. Small investors and management groups need to be permitted to collect reward for innovation in project acquisition, innovation in processes, innovation in financing and innovation in marketing through finding avenues for products and by-products.

As we move up the metal value chain in the domain of base metals and precious metals, the exploration becomes exponentially high risk with progressively diminishing success rates. In this space, greenfield exploration to mine conversion is typically in single percentage digits or even lower. On macroeconomic scale this means that more money gets invested in the exploration value chain in its early stage than will be ever repatriated. This makes perfect regulatory sense to make this space extremely open and easy.

Such a business is inherently unsuitable for government and it would be unwise to invest taxpayer money there. Taking risk if the job of entrepreneurs not government officials who might face a constant peril of being penalized for exploration failures in a space where business decisions can be subjective. Entrepreneurs thrive in such challenging environments, however, such high entrepreneurial risk will only be taken with a promise of windfall profits. The government can facilitate and nurture this new and nascent industry in India by providing it freedom to procure its raw material (tenements); freedom to innovate in technology, financing and marketing; freedom to sell its product (de-risked and permitted mining leases); freedom to make windfall profits and freedom to fail. Several successful regulatory examples exist around the world that can be adopted without essentially having to reinvent the wheel and consequentially it is possible to create a new industrial ecosystem in the country.

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