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Books

- Bowersox, Donald J., Closs, David J., (1996), "Logistical Management." Tata McGraw, Hill, New Delhi.
- Hunker, H.L. and A.J. Wright (1963), "Factors of Industrial Location in Ohio," Ohio State University.

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- Kelkar V. (2009): Towards a New Natural Gas Policy, Economic and Political Weekly, Viewed on February 17, 2011 http://epw.in/epw/user/viewabstract.jsp

BUSINESS IN GEMSTONE POLISHING: AN EMERGING INDUSTRIAL TRAINING & ENTREPRENEURSHIP OPTION FOR INCLUSIVE GROWTH IN EASTERN INDIA

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ABSTRACT

Western India's contribution to business and exports of gemstones and diamond industry is a boon for the country. This heritage trade can also be replicated in the states of eastern India, including Odisha. Due to availability of gemstones in the state; it can equip the youths with industrial training provided by the ITI's encapsulate in to a course module; giving them 'merit certificates' for self employment and employment in the highly skilled category. This in the greater run shall creative inclusive growth and capital for the state, breaking the monopoly market of a few in the domestic trade, creating a comparative pricing of products and services. It can literate the potential customers technically too.

KEYWORDS

Diamond, Gem Stones, International Trade, Lapidary, SEZ (Special Economic Zone).

PRELUDE

India is the place for gemstones and jewellery, known since time immemorial. Kings and queens of ancient India reflected their royalty through storage of precious stones. These precious jewels were not only famous in India but around the globe. Liberalization and globalization has made it a part of elegance and attire of our society. Marketing trends have boosted and countless small jewellery shops have emerged, along with brand names and chain of retail shops etc.. Tanishq of India, a brand operated by Tata Sons is a paradigm in this business. Many corporate players are stepping in to this trade in domestic retailing and exports too.

DIAMOND

As a highly prized gemstone diamond has been cherished throughout the ages in the history of mankind. Because of its brilliant, adamantine luster, transparency and hardness, diamond has been a highly valued gem in the domain of the gemstones. Black diamonds, low-grade, flawed stones, 'bortt', and 'carbonade', are of industrial value and used extensively for polishing the surface of metals, minerals, etc. and in gem-cutting. Its most important industrial use is in cutting edges of drills which are indispensable in modern exploration and mining of minerals. Like graphite, diamond consists entirely of carbon atoms. It is the difference in arrangement of the atoms that gives the two minerals their entirely different properties. In ancient time India has acquired great fame as a source of diamonds, all the celebrated stones of antiquity being the produce of its mines, but the reputation has died out since the discovery of the diamond mines in Brazil and Transvaal; at the present time production has fallen to a very low output. Even so late as the times of Emperor Akbar, diamond mining was a flourishing industry because the field of Panna. The localities noted in history as the chief diamond centers were Bundelkhand (for'Panna Diamonds'); districts of Kurnool, Cuddaph, etc., in Andhra Pradesh State (containing the 'Golconda Diamonds'); and some localities of central India such as Sambalpur (Odisha), Chanda, etc. The diamondiferous strata in all cases belong to the Vindhyan system deposits. A certain proportion of diamonds were also obtained from the surface-diggings and alluvial- gravels of the rivers of these districts. Two diamond bearing horizons occur among the Upper Vindhyan rocks of Central India: one of these Panna region is a thin conglomerate band separating the Kaimpur sandstones from Rewa series. The diamonds are not indigenous to the Vindhyan rocks but have been

assembled as rolled pebbles, like other pebbles of those conglomerates, all derived from the older rocks. The original matrix of the gem, from which it separated out by volcanic rocks, associated with the Bijawar series, some of which have been mapped recently. The dykes of basic lava that have penetrated the formation are supposed to be the parent-rock of the diamonds of India. The celebrated "Golconda' diamonds were mostly derived from a conglomerate mainly composed of the rolled pebbles of these dykes. The 'Koh-i-noor', 186 carats, and the 'Pitt', 410 carats, are among the most famous diamonds produced by India. (Wadia, 2010)

CRAFTSMANSHIP AND MAKING OF JEWELLERY

Jewellery making was a traditional business, inherited by a goldsmiths or Sonars, a clan of people dedicated to jewellery making. This trend of a single family jewellery shop has shifted to multiple numbers of branded outlets, co-creating brands and business, distributed in the supply chain. It provides huge opportunity for prices and innovative designs. Indeed, the emerging trends have shown various career opportunities in the field of jewellery design. But today the industry is facing shortage of skilled labours and trained people.

PRODUCT DEVELOPMENT

In fact, the refining process of jewellery is important. As it adds value from its crude stage to the final product stage, the price tags of the product become higher. Kohinoor diamond is admired for its size, cutting and finish worldwide. The Golconda mines, spread over the border of Maharashtra and Andhra Pradesh, once produced the largest, finest and the only diamonds the world knew. Years later, the Golconda mines were abandoned and are believed to be exhausted. And India disappeared from the map of diamond roughs production. Ironically, though, it has emerged as the largest importer of roughs and the largest exporter – 70 percent by value and 85 percent by volume – in the world's polished diamond market. (Singh, 2011) But a recent find by the mining giant Rio Tinto promises to change this. During drilling and prospecting at Bunder im Madhya Pradesh in 2004, the company had discovered a web of pipes, which it claims could hold the biggest find in the world in the last 10 years. (Rath, 2007) Therefore it is the refining process which needs special attention and focus, and ultimately the industry trained workforce with hands on experience. Gemstone polishing transforms a worthless piece of stone to a beautiful piece of artifact and gives a price tag. Thus gemstone polishing has emerge as a emerging career option, which can be imparted in the Industrial Training Institutes-ITI's, developing course modules like other trades. This can also be given to cater to the market demand like the fitter trade, welding trade and electrical trade etc. given for requirements of the industry.

BOOMING GEMSTONE INDUSTRY

Gems and jewellery form an integral part of Indian tradition and is related to the legacy passed from one generation to another. The components of jewellery include not only the traditional gold but also diamond and platinum accompanied by a variety of precious and semi-precious stones. It is seen that the Indian gems and jewellery sector is expected to grow at a CAGR of around 13 per cent during 2011-2013, coupled with private sector initiatives. Similarly as per the credit rating agency named Crisil, the diamond industry in India is predicted to remain stable during 2010-11 due to improved prices and steady demand. Moreover, gems and jewellery exports from India are expected to grow by 30-35 per cent in 2010-11quotes 'Gem and Jewellery Export Promotion Council' (GJEPC). It is due to the demand in the international markets.

INDUSTRY STRUCTURE AND INDIA

This industry and market is highly dominated by unorganised players. But the increase in consumer income and economic prosperity, has carved a roadmap for the future of organised retail in India and international market. Needless to say that, in a bid to enhance market strategy, a gems and jewellery special economic zone (SEZ); sprawling over a 40 acres, with an investment of US$ 441.1 million is being planned to be set up by Gold Souk-a jewellery mall developer. Gold Souk company plans to have residential apartments named Gold Souk City, apart from having gems and jewellery manufacturers from Thailand, Malaysia, Indonesia and Dubai will open their units in India.

Early studies have proven an inferred resource of 27.4 million carats of diamonds. Industry sources say this translates to an annual value of roughs in the region of $ 300 million, assuming a life span of 15 years for the mine.

Over the years India has emerged as the world's workshop for cutting and polishing diamonds. An estimated 850, 000 workers toil away in Surat and other centers producing diamonds for use in precision industrial equipment and jewellery. Trade figures reveal India exported INR 1, 09,971 crores worth of cut and polished diamonds in calendar 2010. That's 65 percent of the total value of gems and jewellery exports from India. Despite the recession and despite exports and manufacturing units hard hit, diamond exports grew at a steady clip – 4.2 percent in financial year 2009 and 28 percent in financial year 2010. Significantly, gem and jewellery exports accounted for 17 percent of the country's total merchandise exports estimated at INR 8, 35,264 crores. The official worldwide monitor of the industry – the Kimberly Process Certification Scheme (KPCS), in its global summery for 2009 said India produced a meager 9,317 carats of diamonds worth $ 1.66 million. Most of these are sourced from the public sector National Mineral Development Corporation (NMDC) mines at Panna in M.P. In the financial year 2010 Indian manufacturing units imported nearly 150 million carats roughs valued around INR 42,500 crore, 60 percent of these roughs being sourced through Belgium. Without any doubt India is the largest importer of roughs by a wide margin.

INDIA'S MARKET SHARE AND EXPORTS

INDIA BEING THE WORLD'S LARGEST DIAMOND CUTTING AND POLISHING CENTRE IN THE WORLD, IT REQUIRE TRAINED YOUNGSTERS TO ENHANCE PRODUCTIVITY ADDING VALUE TO THE ARTIFACTS FOR THE INTERNATIONAL MARKETS: India accounts for 60 per cent value share, 82 per cent by carats and 95 per cent share of the world market by number of pieces. In India Surat is India's diamond processing hub, contributing to over 80 per cent of the country's diamond processing industry; with annual revenue of around US$ 13.03 billion. India is the third largest consumer of polished diamonds after the US and Japan, and is one of the largest exporters of gems and jewellery India is the diamond polishing capital of the world. It is becoming the fastest growing market in the world. Branded jewellery is turning to become the fastest-growing business segment in domestic sales, expected to grow at 40% per annum, to the tune of $2.8 billion by 2012 and exports expected to grow from $15.5 billion (2005) to over $29 billion (2012).

A KPMG report released in 2006 on the Indian gems and jewellery trade projected that worldwide jewellery sales would rise from $ 146 billion to around $ 230 billion in 2015. With rising sales of alternative luxury goods and introduction of synthetic diamonds, the report predicts a slowdown from growth rate of 5.2 percent CAGR till 2005 to 4.6 percent in the 2010 – 2015. Amongst the slowest growing segments would be diamond jewellery at around 3.3 percent. A major reason for the possible slowdown is the looming shortage of roughs, concedes. It is no wonder that the polishing and cutting industry in India wants the government to ensure that Indian units have the first rights of purchase for the Bunder roughs.

In the present context the global costume jewellery and accessories market is estimated at US$ 16.3 billion. Out of that India exports appx. US$ 53 million. From US$ 16.3 billion since period last it rose to US$ 23.5 billion during April-November 2010. Here it registered 38.25 per cent growth quoted 'Gem and Jewellery Export Promotion Council (GJEPC)'. The export of coloured gemstones stood at US$ 19.16 million at a growth rate of 23.85 per cent in November 2010; as compared to US$ 15.47 million. During April-November 2010, US$ 177.16 million worth of coloured gemstones were exported. Similarly rough diamond exports stood at US$ 620.95 million, and cut and polished diamond exports posted a growth of 52.76 per cent, with US$ 16.4 billion worth of exports during April-November 2010.

For instances, export to the US hogged a lion's share earlier. But not any longer, as India and China's local jewellery buying is on the role with increased purchasing power. By 2015, China with 13 percent and India 12 percent of the world's jewellery consumption will together emerge as a market equivalent to that of the US's share of 26 percent, predicts the KPMG report. Given the difficulties of sourcing roughs by the cutting and polishing trade, it is not surprising that the development at Bunder is being watched with great interest.

INDIAN CRAFTSMANSHIP AND GOVERNMENT INITIATIVE

India's traditional strengths made India significant in the global gems and Jewellery business. Though not having 'scientifically trained and certified skilled manpower', India has traditionally highly skilled and low-cost craftsman on manufacturing and polishing of jewellery and diamond. Government is also working to formulate norms to meet international compliance code for manufacturing.

In order to open new avenue for bullion trader community, the recent strategic tie-up between Bombay Bullion Association (BBA) and Indian Commodity

Exchange Ltd (ICEX) has harness huge investment. It also associated the potentials of small unorganised players and provided multiple delivery centers across the country by leveraging on MMTC's and BBA's pan-India network, strengthening the delivery infrastructure of Indian markets. India government is boosting the industry formulating new rules.

INDUSTRIAL TRAINING IN GEMS CUT AND POLISH

The process of cutting and polishing gems is **called gem-cutting or lapidary**, persons called lapidarist. Normally rough gemstone materials are lightly hammered to knock off from the stone. This process is called cobbed. All gems are cut and polished by progressive abrasion using finer grits of harder substances. In fact, diamond is the hardest naturally occurring substance. For cutting softer gemstones silicon carbide-a manmade compound of silicon and carbon with a Mohs hardness of 9.5 is widely used. Other compounds like cerium oxide, tin oxide, chromium oxide and aluminum oxide etc. are also used.

LAPIDARY TECHNIQUES AND TRAINING

Several common techniques are used in the lapidary work. They are sawing, grinding, sanding, lapping, polishing, drilling and tumbling. By using these techniques, gemstones are typically shaped into one of several familiar forms given below. These forms are cabochons, faceted stones, beads and spheres, inlays, intarsias and mosaics, cameos and intaglios etc..

As an example in the case of cabochons, one of the simplest lapidary norms, a stone can be smoothly rounded and polished on top. It can be relatively flattish or flat or slightly rounded on the bottom. This form of cutting is often used for opaque or translucent stones. Coloration and patterning provide major interest in such stones. Cabochon cutting or cabbing, is often performed by simply holding the stone in the fingers. Similarly in Cameos and Intaglios are carved with portraits in stone or seashells. Cameos are raised portraits, while intaglios are carved down into the surface of the material. Both typically take advantage of different colored layers of material. The finest cameos and intaglios have traditionally come from Italy-usually shell or Germany-usually of agate.

FIRST GEM TESTING LABORATORY IN INDIA

The first gem testing in India was set up in 1971 by the Gem & Jewellery Exporters Association. This gem testing laboratory is a service organisation working for the benefit of Indian gem industry, and is a turning point in the history for its contribution to scientific development in the field of gemmology. The Laboratory is also open to the general public. It also offers service to customs department, income tax and police etc. This is located in the heart of the gemstone market in Bombay, Zaveri Bazar. Till date more than 50,000 gemstones have been certified.

GEMOLOGICAL EDUCATION AND EMERGING LOCUS OF CERTIFICATION

The Gem Testing Laboratory was subsequently recognized by CIBJO-apex trade organization of gem trade in the world. GII's Gem Testing Certificates are of international standard and valid across the globe. It provides credibility to Indian gem industry, which foster growth of exports from India. Since the science of gemstone started in India, exports started booming. Gemmological education indirectly gave fillip to export of gemstone from the country.

GII started the Research and Developmental activities as early as in 1976. Since then it covered applied and pure science, study on gemstone and their properties, with a view to improve the quality of gemstones. GII was recognized as an R & D Laboratory by the Department of Science and Technology, Government of India. Subsequently they were recognised as Scientific Industrial Research Organisation (SIRO) by the ministry of science and technology, Government of India in 1998.

TRUST IS THE KEY TO BUSINESS: QUALIFIED EXPERTS ARE NEEDED

This business of gem and diamond is in a nascent stage of business. This trade is susceptible to utter disbelieve in the buyers. Some business dealer sale synthetic, treated/enhanced diamonds and gemstones, instead of High Pressure High Temperature (HPHT) diamonds, hiding the quality.

Unless these pricy products are not identified with the help of qualified expertise and state-of-the-art equipments, it is not possible to get detail knowledge of the gemstones. Many scientific methods are there to identify the quality of gemstones and diamonds. It is seen that D-Scope microscope known as gemological microscope is routinely used in laboratories. It is designed to utilize the variety of illumination techniques, which helps us to investigate the internal microscopic world of gem stones. A lot of information can be extracted from general observations under a gemological microscope. It is used to determine whether a gem is natural or synthetic. Through these tests it can detect frosted crystals, dissolved silk in ruby and sapphire caused by heat treatment. Besides it can also read oil in fractures of an emerald indicating clarity enhancement and colour concentration in cracks and pits of jade as an indication of dying.

None the less identification is also done through FTIR (Fourier Transform Infrared Spectroscopy), Raman Spectrophotometer, UV Visible Spectrophotometer, Fluorimeter, Diamond View, Diamond Sure etc. for identification of Treatments, Synthetics, Simulants etc. in Diamonds and Gemstones.

CREATION OF HUMAN CAPITAL FOR INCLUSIVE GROWTH

Bombay has all along been economically progressive for its natural location; being close to west; shipping trade and commerce. Similarly Surat grew up with business in gem and diamond trade for it's proximity to Mumbai.

Western India's contribution to exports of gemstones and diamond is a paradigm for other states to emulate. Never the less, this trade can be transplanted in the states of eastern India for alleviating the economy, including poorest state of Odisha which is filled with minerals and Jem stones. This can happen by training and developing a work force highly skilled in the arena of gemstone and diamond processing or lapidary techniques. If lapidary knowledge is imparted with hands on experience in the ITI category providing industrial training by ITI's in Odisha it can create a magic economy. The academic experts have to design demagogy and pedagogy, course modules to provide 'merit certificates' like any other trade in ITI. It can develop self employment and employment opportunities in India and abroad. Specialized advanced programmes in the levels of Diploma engineering and Degree engineering are required for the purpose of augmenting entrepreneurship and medium industry promotion in Odisha. The role of the state technical university is inevitable in this aspect. State university geology and geography departments inclusion in this drive is highly essential. More than 3Lakhs or skilled and semi skilled workforce are involved in the gemstone polishing units at different hubs in India.

PLATINUM : THE WHITE GOLD

Platinum has been discovered in Odisha. Highly promishing deposits of platinum ore have been found in the laterites of Bhubana – Barapada region of Dhenkanal and Keonjhar districts, respectively. This discovery has been made by Directorate of Mines and Geology. The National Physical Laboratory (NPL) has determined the metal content to be 220 to 520 grams per tone of ore, which is stated to be the highest recorded value of platinum occurring in nature in the world. This rich grade of deposits is also commercially viable. Platinum is used as a catalyst in the exploration of hydrocarbons and in the electrical and pharmaceutical and chemical industries. Odisha possesses about 95 percent of India's ultra basic rocks which are primary sources of chromium, nickel and cobalt. The platinum ore deposits occur in 450 square km area which is only one sixth of the 3000 square km of laterite rocks in Odisha which has been surveyed. Barapada, Damphidi, Madanpur, Khad, Kabahali and Pathrapada have platinum ore deposits. Unfortunately in the region extensive laterite slab cutting is going on which may reduce the platinum reserves, hence laterite stone cutting should be banned.(Sinha, 2008)

Cleaver imitation blended with imagination can create innovative art forms acclaimed globally. Art of lapidary has to be planted in the minds of youngsters wanting to grow in life, understanding the market forces. This ultimately shall creative inclusive capital for the state, create human architects, break the absolute monopoly of few in the business, creating a level playing field for competition in pricing jewellery, gemstones and diamond etc. It can literate people.

GEMSTONES AVAILABILITY IN ODISHA

Quality of gemstones is determined by its natural origin, beauty, durability, uniqueness, rarity, hardness, and chemical resistance. Occurrences of diamond are associated with the gravel beds of Mahanadi particularly with river island 'Hirakud' in Sambalpur district. Other gemstones are mostly localized in Garnulite belts of Eastern Ghats, while others are found in Deoghar-Pallahara-Mahagiri group of rocks of Deogarh districts. They are associated with iron ore super group, Quarternary sediments and gravel beds of Mahanadi, where garnet, topaz, cat's eye occur. Odisha also produces emerald, ruby, sapphire, aquamarine, cheliodor, chrysoberyl, alexandrite, tourmaline, zireon, moon stone, amethyst, smoky and quartz. (Mishra, 1995)

They occur in Anugul, Sambalpur, Deoghar, Jharsuguda, Bolangir, Sonepur, Boud, Kalahandi, Nawapada, and Rayagada districts. All these districts are located in northern, western and central Odisha and costal districts of the state lack in gemstone deposits.(Sinha, 2008) At present Odisha is one of the leading producers of gemstones in the country and the mining, production and sale of gemstones in Odisha are controlled by Odisha Mining Corporation, Government of Odisha.

Details of deposits of precious and semi-precious stones in Odisha as follows:

OCCURRENCES

1. ***Anugul District*** Magarmukan – jhilli of Nuagaon.
2. ***Sambalpur District*** Charbhati – Beldihi, Bagdhapa – Tabloi, Meghpal – Ranchipada and Budido
3. ***Deoghar District*** Palsama and Jharposi
4. ***Jharsuguda Ditrict*** Bagdihi
5. ***Bolangir District*** Chunchepali – Antaria, Ghumsar – Dehli, Miribahal –Tentelkhunti, Saraibahal- Suklimuri and Naktamunda – Siali
6. ***Sonepur District*** Badmal – Mursundi and Banika – Sonepur.
7. ***Boudh District*** Boudh – Ramgarh and Kantamal – Mammunada.
8. **Kalahandi District** Jillingdhar – Hinjilibahal, Orhabahala- Urharanga, Ghatpara – Sirgiharan, Sirajapali – Tundia and Banjipadar – sargiguda
9. ***Nawapada District*** Sardhapur – patialpada, Kantamal – Babebir Amera Damjahar-Burhaparen – Mantmitarai
10. ***Rayagada District*** Paikadakulguda, Irkubadi – Tarhama & Kairaghati – Karanjgurha
11. ***Khandamal District*** Bargochha and Belghar

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Hoping an appropriate consideration.

With sincere regards

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Sd/-

Co-ordinator