

The Gujarat Diamond Cluster: Is It Forever?



**Yue Man Lee
Sarah Pinto
Rupert Simons
Nina Stochniol
Clara Zverina**

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Executive Summary

India is the world's second-most populous country and while it is still poor, its economy has been growing at 7-8% a year. Within India, Gujarat is a highly industrialized, coastal state that has been growing faster than the Indian average. Gujarat accounts for 19% of the value added in Indian manufacturing, even though it only employs 9% of India's industrial workforce.

Gujarat is home to the world's largest diamond cluster, an essential processing hub between the miners and sorters of diamonds (in Russia, South Africa, Botswana and elsewhere) and the customers of finished diamonds, who are mostly in developed countries. 85% of the world's diamonds (57% by value) are cut and polished in Gujarat. The cluster employs over half a million people, most of whom are low-skilled and poorly-paid manual workers.

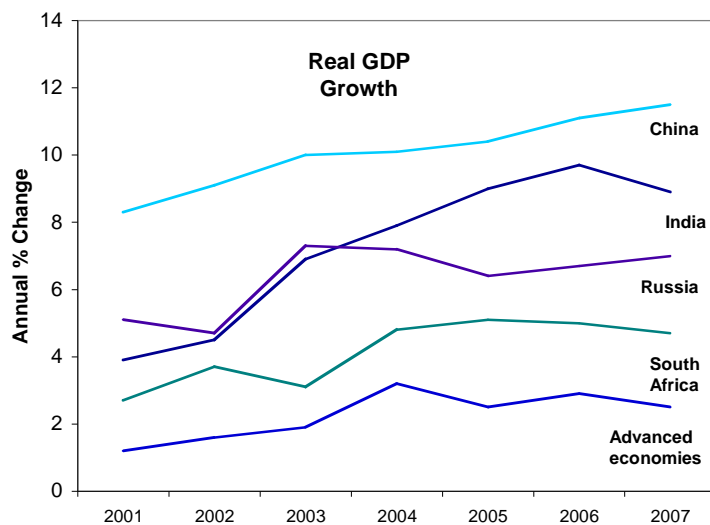
The diamond cluster in Gujarat has developed on the strength of its competitive factor conditions have been critical: its low wages, good infrastructure (by Indian standards) and international networks of Gujaratis from Nairobi to New York. As the structure of the diamond industry changes, however, the cluster in Gujarat is vulnerable to higher-productivity workers in China, supply constraints and a temporary fall in demand as the US recession bites. For the cluster to stay competitive, we recommend that the governments of India and Gujarat take further steps to liberalize product and labour markets. We also recommend complementary moves by industry players, especially institutions for collaboration (IFCs) to promote mergers, research and training, with the ultimate aim of increasing the productivity of the cluster.

1. Analysis of economic performance and the business environment of India

India’s economy has been growing rapidly, however poverty remains high

India’s growth has accelerated since the 1980s. GDP per capita is currently growing at 7.5% annually, a rate that leads to it doubling in a decade (EIU, 2007). This compares to average GDP per capita growth of 1.25% per annum in 1950-1980. The Indian Government has a target of GDP growth of 10% in 2011 (OECD, 2007). Despite rapid economic growth, 80% of India’s 1.1bn people still live on less than \$2 per day, as compared to 36% in China. India trails China, a growing competitor in the diamond polishing industry and other leading emerging market in the world, on most indicators of human development, including literacy, life expectancy and child mortality. The country is classified as having a low level of human development by the UNDP and over 70% of the population live in rural areas.

Figure 1: GDP Growth and key human development indicators



Indicator	India	China
Economic		
GDP per capita (PPP in USD, 2006)	3,452	6,757
Poverty Measures		
UNDP Human Development Index (rank out of 177)	128	81
% People living on less than \$2/day	80.4	36.4
Health		
Life expectancy at birth (births)	64	73
	56	23
Education		
Adult literacy rate (% aged 15 and older), 1995-2005	61	90.9
Combined gross enrolment ratio for primary, secondary and tertiary education (%), 2005	63.8	69.1
Infrastructure		
Telephone mainlines (per 1,000 people), 2005	45	269
Electrification Rate (%)	56	99

Source: UNDP Human Development Indicators (2007)

Economic growth accelerated following extensive market liberalization in 1980s

India's rapid growth is attributable in part to the extensive market liberalization, and financial market reform undertaken by the government in the 1980s. This included a comprehensive program including the removal of pervasive licensing on industrial activity, introduction of FDI incentives, and reduction of tariffs. Since liberalization, the average share of imports and exports in GDP has risen from 6% in 1985 to 24% in 2006 and net inflows of FDI have grown from \$118m in 1986 to \$6.5bn in 2005. (OECD, 2007; World Bank, 2007)

The manufacturing sector is weak and comprises only 16% of the Indian economy

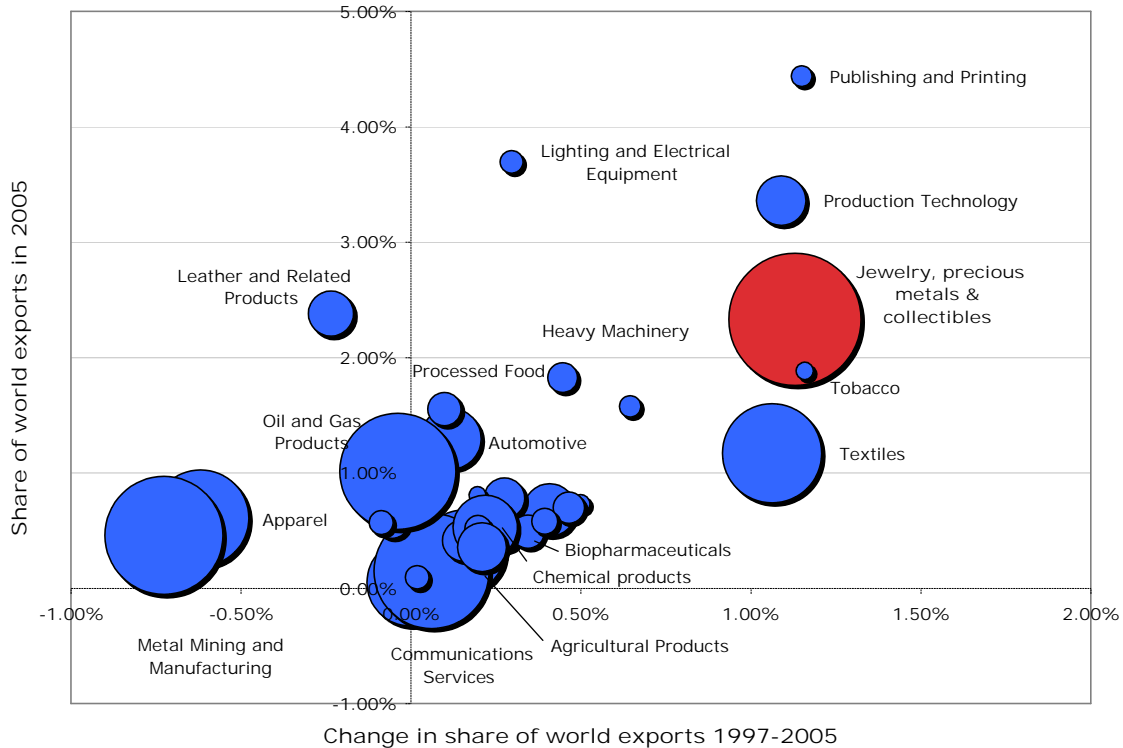
India's manufacturing sector is small and has been static in terms of its contribution to GDP, consistently comprising just over 16% since 1986. This contrasts sharply to the growing contribution by the service sector, which has increased from 44% to 54% in the period 1986-2006. Although it comprises only 18% of GDP, agriculture involves 60% of India's workforce and is therefore a critical intervention area for poverty reduction policies. The shift of the labour force from agriculture to non-agriculture in India has been particularly slow, largely as a result of rigid labour laws in both the agricultural and the industrial sector (EIU, 2007).

Gems and jewellery are a leading export cluster, experiencing relatively high growth

At \$16.3bn in export value, gems and jewellery are India's largest export cluster. 80% of this cluster comprises cutting and polishing of diamonds. India's cluster map clearly reveals that few export clusters fall into the manufacturing category. Furthermore large

manufacturing clusters, such as apparel, metal and mining manufacture, have seen a decline in world export market share between 1997 and 2005. In contrast, India’s share of world exports of diamonds has increased at a rate above most other clusters.

Figure 2: India’s Export Cluster Map



Source: Harvard Business School Institute of Strategy and Competitiveness

India is rising on Global Business Competitiveness Rankings

India was ranked 31st out of 131 countries in the 2007 Business Competitiveness Index, rising 7 places since 2001 (Global Competitiveness Report, 2008). India’s key drivers for growth include favorable demographics, a high-skilled labour force, including highly trained scientists and engineers, a growing middle class with increasing spending power, rising integration with the world economy, a stable democratic system and strong

institutions. Although innovation capacity, as measured by the number of patent applications, trails the U.S., it has been growing four times as fast as the world average.

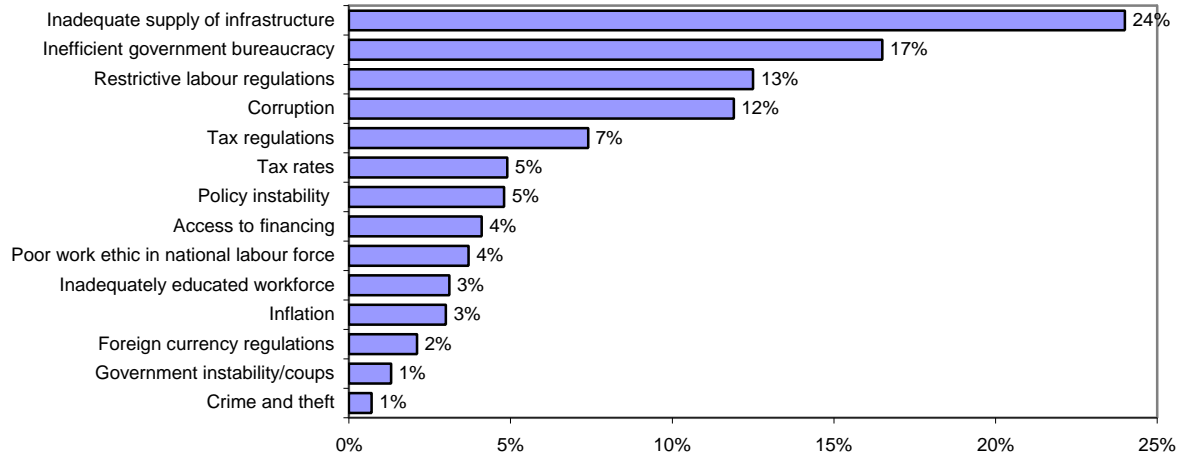
The business environment has key weaknesses, especially for manufacturing firms

The key constraints on competitiveness and growth fall in **factor conditions** and **context for firm rivalry**. The three principal barriers are infrastructure bottlenecks, rigid labour regulations and a high administrative burden of doing business (refer to Figures 3 and 4). For example, manufacturing companies need to obtain government permission to lay even one worker off in manufacturing plants with more than 100 workers. As a result, 87% of employment in Indian manufacturing is in firms with fewer than ten employees, compared with only 5% in China (Economist, 2007). The manufacturing sector clearly fails to fully exploit benefits of economies of scale (OECD 2007). India ranks 120 of 178 on the World Bank's Ease of Doing Business Report, behind regional neighbours such as Bhutan (119), Sri Lanka (101), China (83) and Pakistan (76). It performs particularly badly on components such as contract enforcement and paying taxes, where it ranks in the bottom fifteen of the world. The Global Competitiveness Report 2008 identifies poor infrastructure, inefficient government bureaucracy and restrictive labour market regulations as the biggest constraints to India's competitiveness (see Figure 3).

These weaknesses lead to the absence of manufacturing clusters identified in the analysis of **related and supporting industries**. Furthermore, although India's rapid economic growth is leading to an emerging middle class with increasing wealth and spending

power, there is significant variation between different states and between rural and urban regions, and the **demand** for luxury goods like diamonds is still limited.

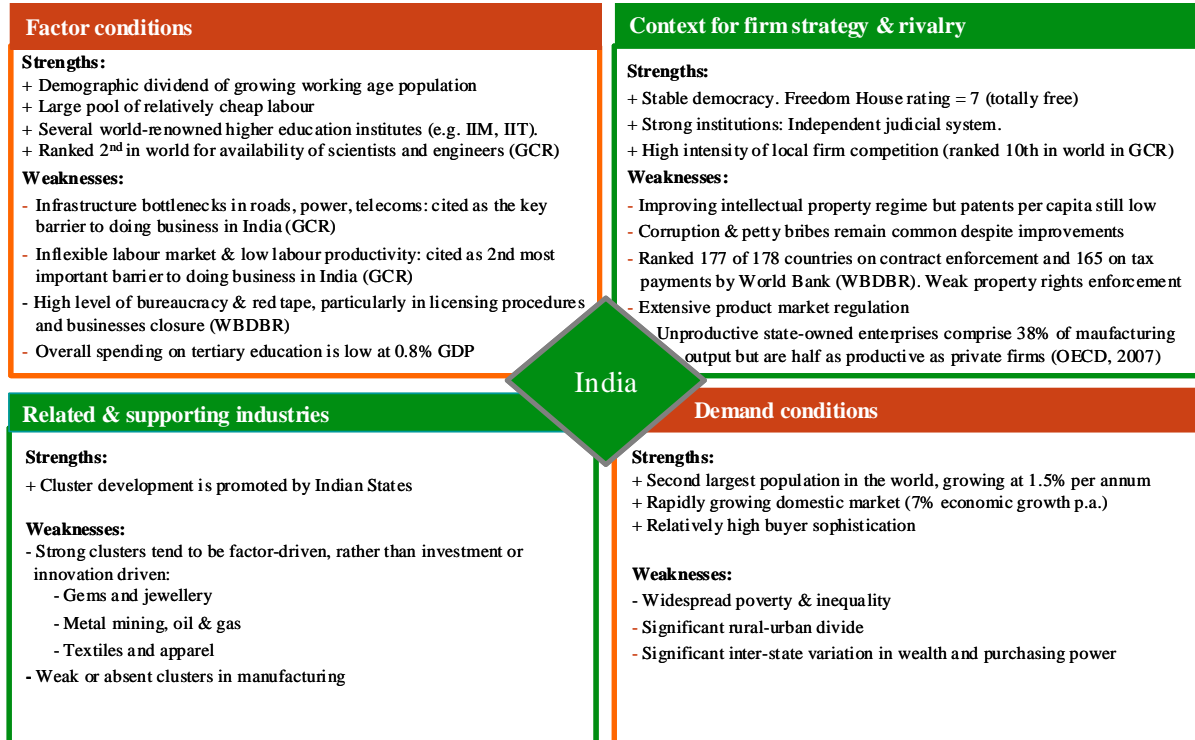
Figure 3: Biggest constraints to competitiveness reported by Indian businesses



Source: World Economic Forum Global Competitiveness Report, 2007-2008

These findings are summarized in the national diamond for India, given below.

Figure 4: India's National Diamond



Source: Team Analysis
(GCR: Global Competitiveness Report, WBDBR: World Bank Doing Business Report)

2. Analysis of economic performance and the business environment of Gujarat

Gujarat is one of India's most industrialized states

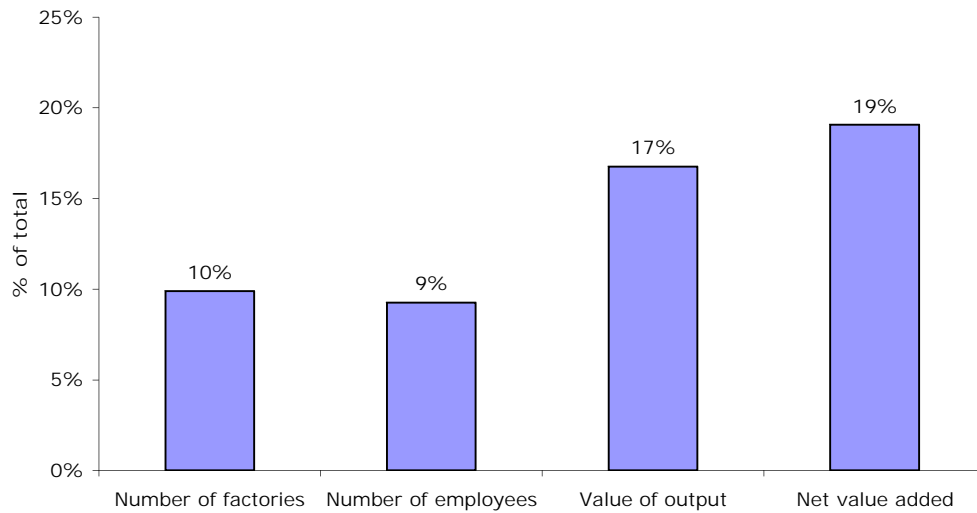
Gujarat is a coastal state in the west of India, between the commercial capital of Mumbai and the border with Pakistan. It has an extensive diaspora in East and South Africa, where Gujaratis are heavily involved in trading and extractive industries. Gujarat is relatively prosperous by Indian standards and its industrial productivity is especially high, as the following facts attest (Government of Gujarat, 2006):

- Gujarat's net domestic product (NDP) per head is around \$650 at market prices, \$120 more than the Indian average¹
- Between 1994 and 2005, Gujarat's NDP per capita grew by 5% a year, compared with an Indian average of 4%
- Gross fixed investment in Gujarat is twice the Indian average at \$150 per capita

The Government of Gujarat (2006) reports that 40% of Gujarat's net domestic product is generated by the manufacturing industry, compared with 20% in India as a whole. This high contribution reflects high productivity in the industry: while Gujarati factories employ only 9% of India's industrial workforce, they generate 19% of the value added.

¹ Figures are for 2006 and sourced from IndiaStat, available at www.indiastat.com/. Net domestic product at factor cost is the only measure that is available for all states. It is slightly different from gross domestic product (GDP) in that it excludes replacement investment and is not available in purchasing power parity (PPP) terms.

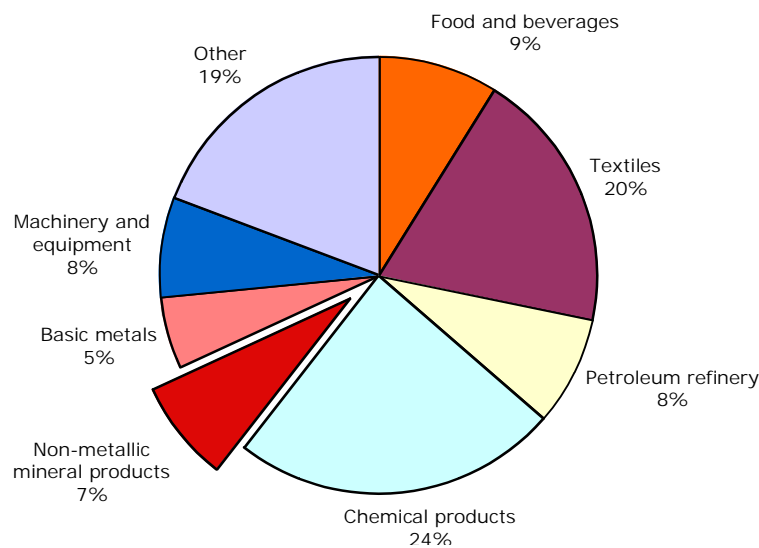
Figure 5: Manufacturing industry in Gujarat, percentage of India total



Source: Government of Gujarat (2006) Socio-Economic Review

The principal industries in Gujarat are shown in the pie chart below. Non-metallic mineral products (mostly diamonds) account for 7% of formal sector industrial employment in Gujarat; however, most of the jobs are in the informal sector, so this chart probably understates the importance of diamond cutting and processing to Gujarat.

Figure 6: Industrial clusters in Gujarat, % share of formal manufacturing employment



Source: Government of Gujarat (2006) Socio-Economic Review

Gujarat has relatively good factor conditions, especially infrastructure

The State of Gujarat has invested heavily in infrastructure and enjoys some of the best ports, roads and railways in India. 95% of the roads are paved and 17,823 out of 18,056 villages had some connection to the electricity grid in 2005, usually for agricultural purposes (especially pumps), but increasingly also for domestic use. 69% of the Gujarati population are literate, which is low by world standards but compares favourably with the Indian average of 61%. Infant mortality has been reduced from 116 to 57 per 1,000 births between 1981 and 2006 (Government of Gujarat, 2006).

As a relatively educated, urbanized state (37% of the population live in urban areas, compared with 27% in India as a whole), Gujarat has a large pool of labour available. However, it does not use this labour efficiently, in part because of extensive regulations that constrain labour productivity. Immigration has been running at 0.2% of the population per year, several times lower than the net immigration rate of fast-growing US states (Clark and Wolcott, 2003). Gujarat suffers from the same restrictive labour laws as the rest of India, which are designed to protect workers but end up emasculating job creation. Martin Wolf (2005) writes: “Indian workers are so well protected from exploitation that they have no jobs at all.”

Gujarat has some advantages in demand conditions

Gujarat’s location and history help explain why it has developed a diamond cluster, even though there is virtually no local demand for diamonds. Gujaratis have a lengthy history of trading with Africa. In the 19th and early 20th centuries, many Gujaratis went to work

as labourers in South and East Africa and stayed to become traders.² Later waves of emigrants included professionals such as doctors, lawyers and engineers. Many Gujaratis were forced to leave Africa in the 1970s (they were forcefully expropriated and evicted from Uganda, for instance) and settled in Canada, the UK, USA and Australia. These frequent moves have allowed Gujaratis to develop transnational networks, through which they are present at all stages of the diamond value chain: from mining the stone in Africa to its final sale in London or New York. The state's proximity to Mumbai, with its large port and airport, has also contributed to its success: Surat, the centre of the diamond cluster, is located in the south-east of Gujarat, only a few hours from Mumbai. Surat is an industrial city with 3.5 million inhabitants that is a major hub for textiles, as well as diamond cutting and polishing.³

The context for firm strategy and rivalry is improving in Gujarat

India's states have considerable freedom to shape their economic destiny, especially since the beginning of the economic reforms in the 1980s. They have substantial tax and spending powers and control many product and labour market regulations. Clark and Wolcott (2003) characterize India as "one polity, many countries" when they point out the divergent growth. Gujarat has taken advantage of this freedom to follow pro-business policies, led by its charismatic and controversial Chief Minister, Narendra Modi.⁴ Gujarat was one of the first states to announce plans for Special Economic Zones (SEZs) under a 2005 Act empowering states to create them. By April 2008, Gujarat had notified the

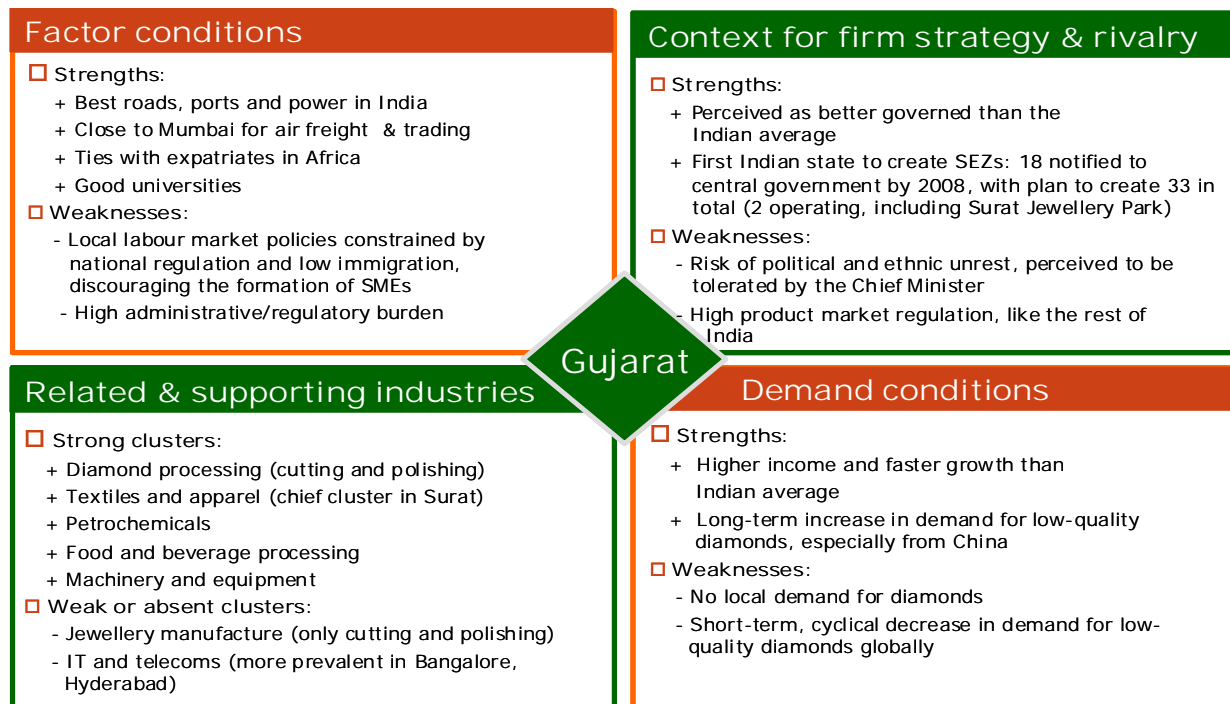
² An anecdotal impression of the Gujarati community is available at <http://www.littleindia.com/february2002/The%20Gujaratis.htm> and http://news.bbc.co.uk/2/hi/south_asia/1148967.stm. There are no confirmed numbers, but they are estimated at close to a million in South Africa and Kenya.

³ Surat was profiled in the New York Times at http://www.nytimes.com/2005/12/07/international/asia/07highway.html?_r=1&oref=slogin

⁴ The BBC profiles Modi at http://news.bbc.co.uk/2/hi/south_asia/1958555.stm

central government of 18 such zones; 2 were operational.⁵ One of the first SEZs to be set up was the Surat Jewellery Park (Solitaire International, 2008). Special Economic Zones have been associated with unpopular land evictions in West Bengal and Uttar Pradesh, but there is no evidence that they are controversial in Gujarat. Most institutions for cooperations (IFCs) are state regulatory bodies, but one recent innovation are District Industry Committees (DICs), which are intended to be ‘one stop shops’ for entrepreneurs needing to access credit, power, raw materials, etc (Government of Gujarat, 2006). There are specific IFCs in the diamond industry which will be detailed later.

Figure 7: The diamond model applied to Gujarat



Source: Team analysis, based on KPMG report and Government of Gujarat

⁵ The full list is available at <http://www.sezindia.nic.in/>

To sustain competitiveness and economic growth, there is a need for product and labour market reforms in both India and Gujarat

In India as a whole, the OECD (2007) reports that industries in which the government has eased regulation and encouraged competition, such as telecommunications and IT services, have grown fast. State-owned firms still account for 38% of output in the formal non-farm business sector, yet the OECD estimates that private firms are on average one-third more productive than public-sector ones. States with looser labour- and product-market regulations enjoy higher labour productivity. This finding is confirmed by Aghion et al (2005), who find that:

“Following delicensing, industries located in states with pro-employer labor market institutions grew more quickly than those in pro-worker environments.”

Gujarat has grown faster than the Indian average, thanks to its coastal location and policies that have favoured investment in infrastructure and private industry. However, to remain competitive, especially in diamond cutting and polishing, the Government of Gujarat must now take steps to improve labour productivity. Reducing the restrictions on hiring and firing workers, reducing the reporting requirements on small and medium-sized enterprises (SMEs) and allowing employers to pay incentives will be essential to improving productivity in Gujarat and in the diamond cluster in particular. We will return to the question of labour productivity, SMEs and economies of scale in our recommendations for the diamond cluster.

3. In-depth analysis of the diamond-processing cluster in Gujarat

Diamond-processing in India as part of a global value chain

The diamond value chain consists of exploration of diamond mines, mining rough diamonds, sorting, distribution and trading of rough diamonds, processing, distribution and trading of polished diamonds, jewellery manufacturing and retail (Porter et al, 2007).

Figure 8 illustrates the global reach of the diamond value chain. Mining operations are predominantly in Africa, with the majority of mines in South Africa and Botswana.

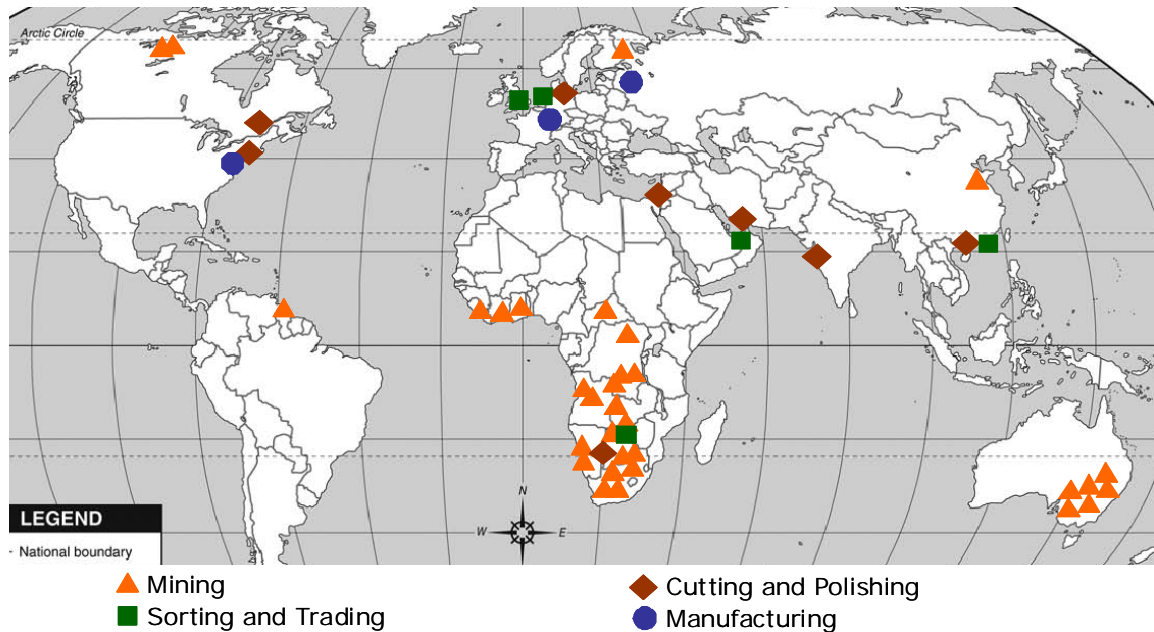
However, new mining sites have been explored more recently in Canada and Australia, as well as Russia. The rough diamonds are transported from the mines to sorting centers, where they are sorted based on characteristics that will determine their value upon processing, such as size, shape, clarity, cuttability, and colour (Porter et al, 2007).

Traditionally, the DTC's main sorting center has been London. In March 2008, however, De Beers launched its new sorting facility in Botswana, to which most of the traditional London sorting will be transferred (National Jeweler Network, 2008). Centers for the processing of rough diamonds, which includes cutting and polishing, are New York and Antwerp for high-value diamonds, Tel Aviv, Israel for medium-value diamonds, and Gujarat for low-value diamonds. The manufacturing of cut diamonds into jewellery currently takes place close to the main retail markets, the United States and Europe.

Figure 9 illustrates the percent of retail value of diamond jewellery that is captured at each point in the diamond value chain. The polishing part of the value chain, in which the Gujarat diamond cluster specializes, captures only 4% of the total retail value of diamond jewellery. Indeed, because India focuses on processing of low-value diamonds, it

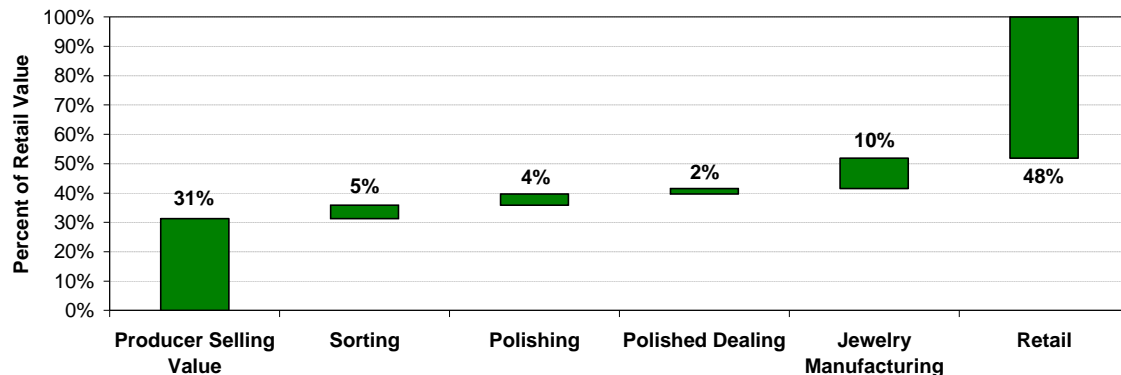
captures even less of the total value. This is illustrated in the fact that while India processes 85% of the world’s diamonds by volume, this represents only 57% of the world’s diamonds by value (Lakshman, 2007).

Figure 8: The global diamond value chain



Source: Duke University; team analysis.

Figure 9: Percent of retail value captured at each step of the diamond value chain



Source: “Value Chain”, Commodity Focus – Diamonds, The Mining Journal, Ltd., October 27, 2006.

The diamond cluster in Gujarat is the largest and cheapest in the world

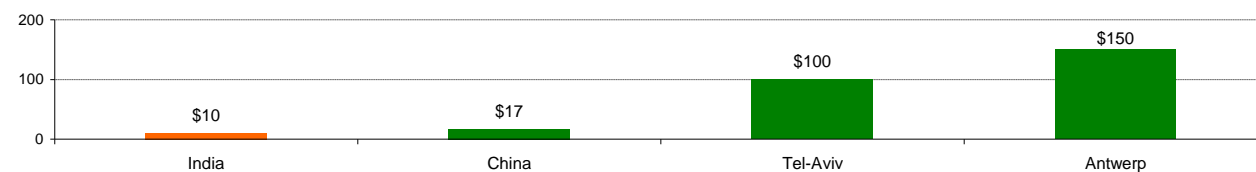
The first known diamond cutting factory was started in 1938 with 65 workers. However, cutting and polishing of diamonds only developed widely after 1962, based on the ability of Indian artisans to convert near-gem rough diamonds discarded by the rest of the world into diamonds. In the seventies, the cluster exports to the U.S. for the first time and was estimated to have around 1,200 cottage units providing employment to about 20,000 workers. The wide adoption of technology in the late 1980s (the Indian Diamond Institute help introduced the dop) increased productivity of the sector (Vikas, NMCC, 2008). Today, the Indian diamond processing cluster is the largest in the world, with market shares of 85% in volume and 57% in value (Lakshman, 2007). Exports have consistently grown at double-digit yearly rates (20% p.a. in 1970-1990 and 10% p.a. in 2000-2007). Since the 1960s, India has been the cheapest diamond processing hub in the world, at \$10 a carat, 70% less than China and 10 times less than Tel-Aviv in 2007. India still specializes in cutting the smallest, low grade (and low value) diamonds.

Figure 10: Indian exports of cut and polished diamonds (1970-2007)

In \$ million	1970	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007
Indian exports of cut and polished diamonds	59	2,641	4,662	6,187	5,972	7,111	8,627	11,182	12,293	10,839	13,216
CAGR		21%	12%	6%							11%

Source: The Gem and Jewellery Export Promotion Council

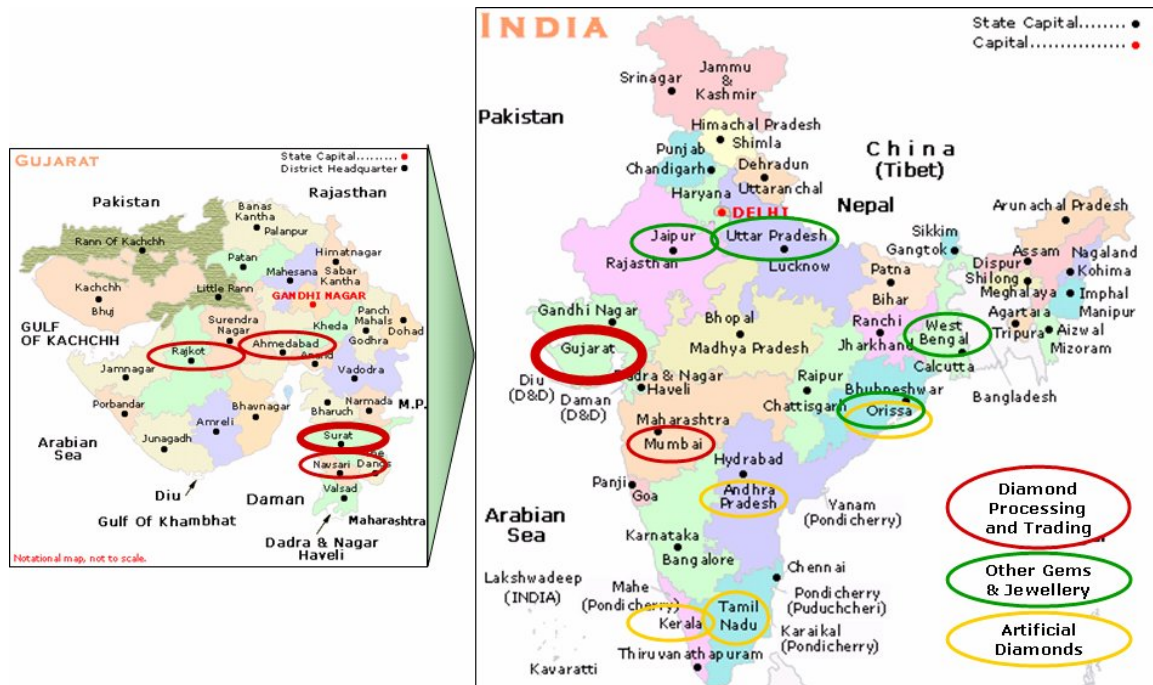
Figure 11: 2007 Labour costs per carat (US\$)



Source: Nandini Lakshman, "Is India's Diamond Biz Losing Its Luster?", BusinessWeek, May 31, 2007.

The diamond cluster is concentrated in Mumbai and Gujarat

Figure 12: Gems and Jewellery Cluster in India (UNIDO, 2005)

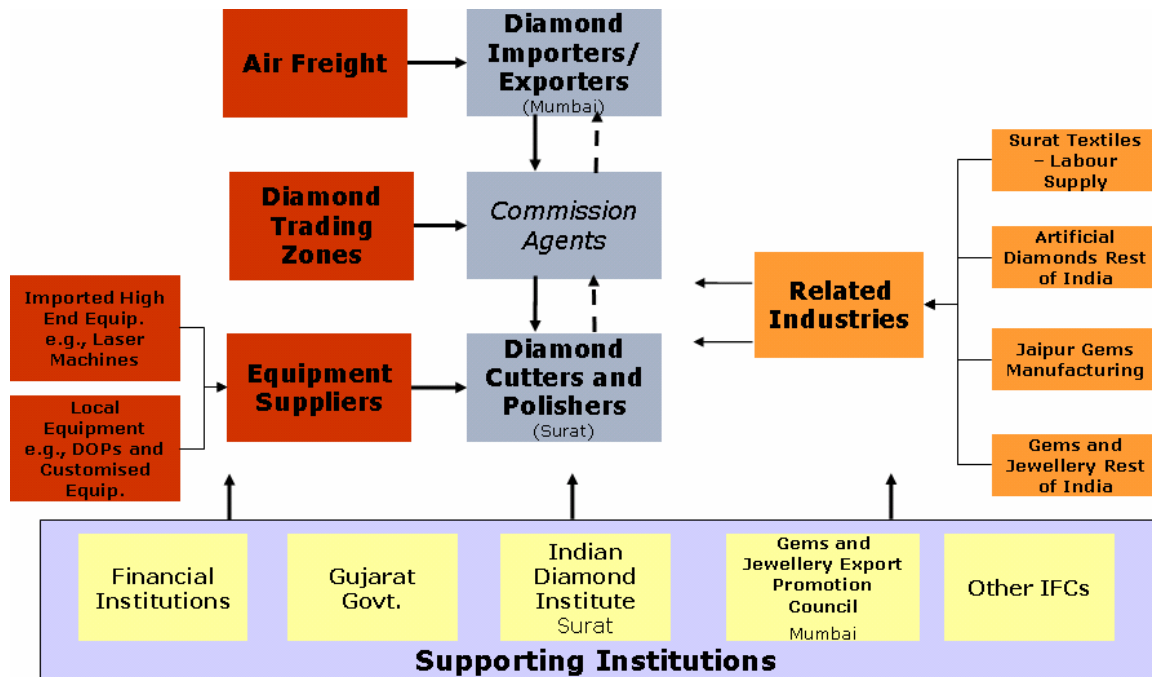


The Gems and Jewellery Cluster consists of diamonds, other precious stones (pearls, color gemstones), synthetics, including artificial diamonds, and jewellery (gold, precious metals and costume/fashion). The cluster is spread throughout India, with diamond processing and trading concentrated in Mumbai and Gujarat. 80% of Diamond Processing occurs in Gujarat, over half of which is in Surat. In recent years, diamond-cutting centers have also come up outside the state of Gujarat especially in Mumbai, Kerala and Tamil Nadu, but mainly in the artificial diamond industry.

Despite the diamond cluster employing 700,000 people, there is little cluster depth

The cluster essentially comprises of importing and processing rough diamonds and exporting polished diamonds.

Figure 13: Diamond Cluster Map (Keyoor, 2002)



Note: The cluster map should be expanded today to include the Surat Hira Bourse, where rough and processed diamond trades are facilitated.

There are 2,000 importers of roughs, 95 of them are based in Mumbai, as Surat did not have an airport until 2007. Only 40 importers are De Beers sightholders; the remaining are small (often sole) traders. The traders sell directly or through small commission agents to the diamonds cutters and polishers through relationship networks and increasingly through bourses – formal physical diamond trading zones – in Mumbai and Surat. There are approximately 6,000 diamond processing units in Surat⁶. The vast majority are small, informal firms, employing an average of 30 workers with capacity of 4 carats, cutting low grade diamonds. These firms are family run/owned with organic growth and no outside capital. Workers have basic skills passed through family traditions (education is not emphasized) and working conditions are unregulated, including the use

⁶ Given the informal nature of the industry, the exact number of diamond processors is unknown.

of child labour. Production is labour-intensive, using basic manual equipment such as the dops. Scale economies and innovations are limited in these firms. There are some 'large/modern' firms, employing up to 1,000 workers with capacity of 400 carats, producing higher-valued, larger-size/fancy-cut diamonds⁷. However, these are still relatively small for manufacturing standards.

Figure 14: Diamond Cutters and Polishers



Restrictive national and state labour regulations and high administrative regulatory burden, including the process of licensing businesses, which particularly affect SMEs in manufacturing are the major reasons for the small scale, informality and fragmentation of firms in this cluster. Once polished, the processors sell back to the traders to export to foreign markets; there is no further capturing of the value chain.

Horizontal integration is also limited in this cluster. The other key input, apart from rough diamonds and labour, is cutting equipment. Equipment required for high end cutting, such as laser machines, are imported⁸. There is some local equipment production of basic

⁷ Product innovations are driven by improvements in its cut, carat, color and clarity.

There have been a variety of new cuts created by the Indian industry that are popular in the US market: Marquise, Pear shape, Heart shape, step cut, baguettes, tapers, etc. (Keyoor, 2002)

⁸ Gujarat has over 500 lasers deployed in the diamond industry alone. Other modern equipment such as computerised diamond planners, auto bruters, semi-automatic and automatic polishing machines are used in some manufacturing units. It is estimated that 80% of the high-tech polishing machines world-wide are sold to India. (Keyoor, 2002)

manual cutting equipment such as the dop and some customized equipment, developed to suit the cutting of low grade diamonds⁹.

In terms of supporting Institutions for Collaboration (IFCs), there are relatively few carrying out significant activities, especially given that this is the largest export cluster in India. The most prominent IFC is the Gems and Jewellery Export Promotion Council (GJEPC) in Mumbai which represents the whole Gems and Jewellery cluster. It has been effective in facilitating export opportunities, supporting the start of training institutions and negotiating with Government on reducing import duties for the cluster. In contrast, whilst the Indian Diamond Institute in Surat, set up by the Government of India, is positioned as the premier IFC for diamonds, it has not been able to fulfil its mandate to provide technical training to cutters, supervisors, managers and maintenance engineers and conduct cluster wide research. It has no accredited laboratory and the training facilities are insufficient for the industry. *For descriptions of the diamond cluster IFCs in detail, see Appendix I.*

There are currently few linkages with the broader Gems and Jewellery cluster. This is because diamond cutting is a specialized activity and the rest of the Gems & Jewellery cluster focuses more on manufacturing and retailing in the local market. In contrast, the diamond cluster is highly export orientated.

⁹ India uses non-perfect diamonds like polycrystalline, macles, distorted crystals, 'near gems' or 'near industrials' making processing not easily amenable to automation. The cluster has indigenously developed machinery to suit these applications e.g., laser kerfing and sawing machines. (Keyoor, 2002)

Limited cluster integration and the small scale and informality of diamond processors are two major weaknesses in an otherwise solid *Diamond* diamond

Factor conditions: Overall, factor conditions are strong given the abundance of cheap labour with basic skills (though this is being eroded by competition from China), good physical infrastructure for trading in Mumbai and now Surat, and cluster specific infrastructure, such as the Bourses and the Diamond Industrial Park.

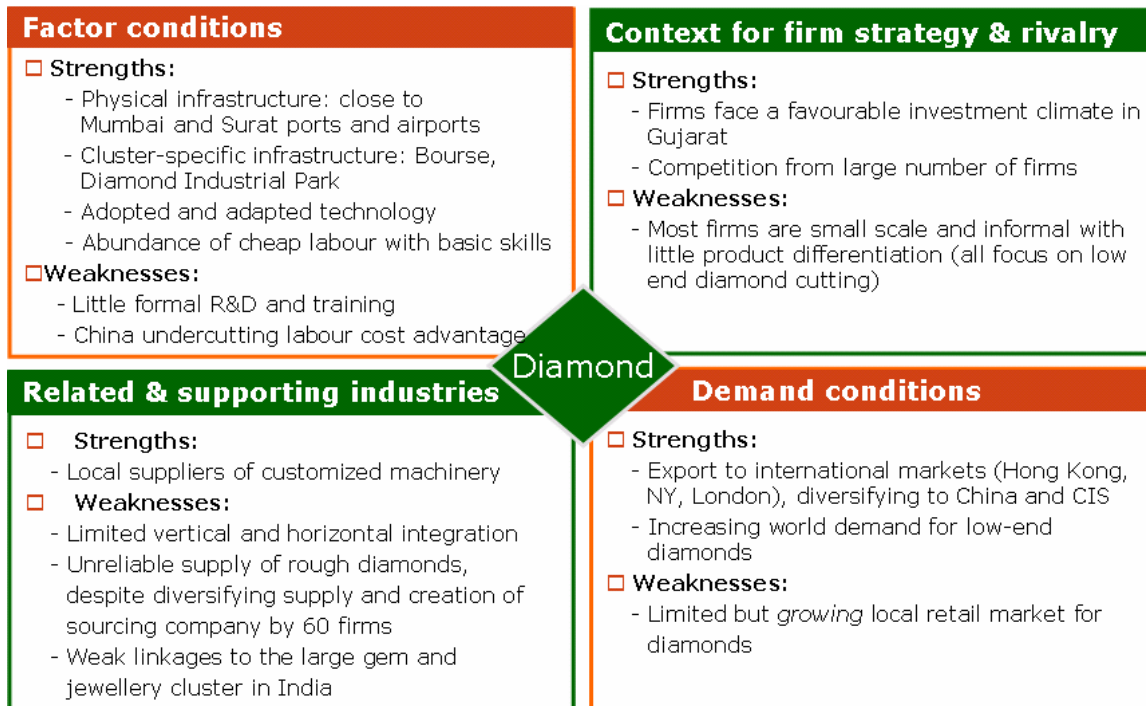
Context for firm rivalry: The generally favourable investment climate in Gujarat (transactions in diamonds have been exempted from sales tax since the start of the cluster) and low barriers to entry is offset by the small scale and low productivity of firms, which compete on price rather than product quality and differentiation. This reflects the generally poor business environment for manufacturing in India, in contrast to China, which has used its large supply of cheap labour to develop a competitive labour-intensive manufacturing sector.

Related and supporting industries: The limited vertical and horizontal integration and weak linkages to the broader Gems and Jewellery cluster are significant weaknesses as they reduce the economic benefits from potential cluster spillovers. Supply of rough diamonds into India is also being increasingly unreliable, although the cluster and Government are responding to this. In 2000, the Government of India signed a joint-venture partnership with De Beers (Hindustan Diamond Company Ltd) for rough dealership. Through this partnership, the DTC also contributed to the advertising campaign of Indian diamonds (Porter, 2007). In 2006, 60 Indian diamond manufacturers

collectively created Diamonds India Ltd (DIL) to provide more stable and diversified rough sourcing to the cluster (through collective purchasing and reselling to Indian diamond processors) (Kuriyan, 2008). In 2007, the Indian government eliminated all custom taxes on imported diamonds in order to boost the cluster.

Demand: Local demand is limited with the cluster relying on exports to international markets (Hong Kong, New York, London, and recently China and CIS) and having benefitted in the past from increasing world demand for low-end diamonds. However, not having a strong and sophisticated local market has contributed to the low productivity and lack of innovation in the cluster. This could change in the future given India’s rapid economic growth and the emergence of a wealthy middle class in India. To capitalize on this growing market would require a shift in local taste from gold to diamond jewellery.

Fig 15: Summary of *The Diamond Diamond* (Keyoor, 2002 and UNIDO, 2005)



4. Strategic issues facing India and the diamond-processing cluster

The Gujarat diamond cluster is facing serious external threats

On the *supply-side*, no new large diamond deposits have been discovered since the exploration of the Northwest Territory mines in Canada, while existing mines are being depleted (Kuryian, 2008). With the end of De Beers' quasi-monopoly on supply and sorting, rough supplies became more fragmented and scarce, leading to price spikes for rough diamonds. Moreover, in early 2008, the DTC dropped eight Indian firms from its *Suppliers Of Choice* list (without boosting supply to the Hindustan Diamond Company, which supplies to many Indian non-sightholders), resulting in a 25% reduction in rough diamond supply to the Indian market¹⁰.

On the *demand side*, the U.S. recession poses a major threat to exports of Indian diamonds. Indeed, the U.S. still represents approximately 30% of India's exports of cut and polished diamonds (Lakshman, 2007) and demand for low-end diamonds cut in India is most sensitive to economic hardship (Solitaire International, 2008). The recent strengthening of the rupee against the U.S. dollar in addition hurts Indian diamond processors' margins, as sales are in dollars, while costs are in rupees. Even more worrisome for the Indian diamond cluster is the sluggish future demand for diamonds forecast by market specialists (KPMG¹¹), due to a reduced demand for engagement rings worldwide and the competition of other luxury products.

¹⁰ Sanjay Kothari, Chairman of the Gem and Jewellery Export Promotion Council (GJEPC), quoted by Kuriyan in the Feb-Mar 2008 edition of *Solitaire International*.

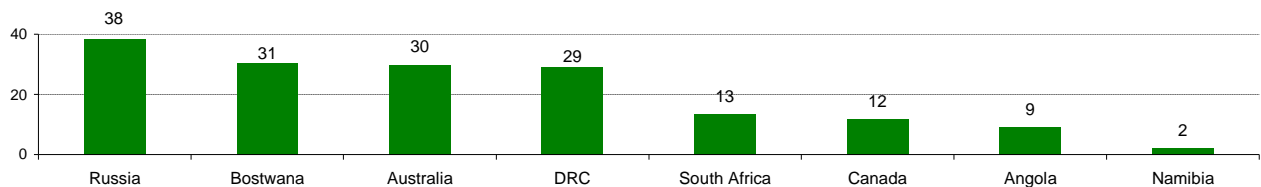
¹¹ KPMG Strategic Report on the Diamond Industry, commissioned by the GJEPC and quoted by Regan Luis in the Feb-Mar 2007 edition of *Solitaire International*.

The Indian diamond processing cluster is facing *growing competition* from other processing centers, in particular from China, which has more modern technology and similar labour costs. The aforementioned KPMG study estimates that by 2015, India's market share in terms of diamond value exported will drop to 49% (from 57%) with the rise of China (Luis, 2007). The Indian diamond processing industry is thus attacked at both ends, with unreliable and increasingly expensive supply, uncertain demand and Chinese competition, putting pressure on the margins of the Indian diamond processors.

However, those threats might give rise to new opportunities

The *diversification of rough diamond supply*, as illustrated by figure 9 below, could also be a blessing for India's processing industry as it decreases the strategic importance of the DTC and creates the opportunity for new partnerships. The Chinese government, for example, signed a bilateral agreement with the DRC in September 2007 for infrastructure projects, as well as rough diamond purchasing (Kuriyan, 2007-2008), ensuring that all DRC diamonds go to Chinese processing units.

Figure 16: World rough diamond supply (in million carats)



Source: Vinod Kuriyan, "Break up! Various forces pull rough diamond supply apart", *Solitaire International*, December 2007 - January 2008.

In terms of *future demand*, even though studies forecast an overall sluggish growth for diamond consumption, they point to new sources of growth coming from new markets such as the CIS (former Soviet Union), China and India itself (Luis 2007). By 2015,

China and India are expected to consume combined as much diamond jewellery as the U.S.. This is an opportunity for the Indian diamond processing industry, as these countries will typically demand smaller diamonds than richer markets and will thus fuel growth in the lower end segment. The KPMG study also argues that new retail formats such as malls, hypermarkets and convenience stores will fuel the growth of small diamond-encrusted jewellery in new markets (Luis, 2007).

Finally, there are some *unexploited linkages* between the Indian diamond processing cluster and other regional clusters. In particular, Gujarat and the whole of India has a large gemstone cutting cluster (\$269 million of coloured gemstones were exported by India in 2007, with 11% market share, making it the second largest exporter in the world) and a large jewellery manufacturing cluster (with exports of \$5.7bn in 2007)¹². However, very few linkages exist between these clusters and the diamond processing industry and very few Indian-processed diamonds are combined with Indian gemstones and/or used to create jewellery for the local or international markets.

¹² Data from GJEPC and International Cluster Competitiveness Project.

5. Policy recommendations

In the table below are our recommendations at the national, state and cluster level.

What?	Why?	How?	Who should implement it?
National			
Improve infrastructure	India's factor conditions suffer from poor roads, ports, airports, water and power supplies	<ul style="list-style-type: none"> ▪ Promote public-private partnerships for infrastructure ▪ Reorient public spending from subsidies to investment in infrastructure 	<ul style="list-style-type: none"> ▪ Government of India in collaboration with private investors ▪ World Bank and other multilateral institutions
Deregulate product and labour markets	There are too many small, informal firms with insufficient scale and low labour productivity throughout India	<ul style="list-style-type: none"> ▪ Simplify business licensing procedures; give incentives for informal firms to enter the formal sector ▪ Simplify regulations on firm mergers and acquisitions ▪ Ease labour regulations, especially for SMEs 	<ul style="list-style-type: none"> ▪ Government of India has to reduce the high administrative and regulatory burden for SMEs ▪ Government of India should allow states greater freedom to set their own product and labour market standards
State			
Deregulate product and labour markets	There are too many small, informal firms with insufficient scale and low labour productivity in Gujarat	<ul style="list-style-type: none"> ▪ Simplify business licensing procedures; give incentives for informal firms to enter the formal sector ▪ Ease labour regulations, especially for SMEs 	<ul style="list-style-type: none"> ▪ State government in collaboration with employers and unions (if possible)
Cluster			
Securing Supply	There is a shortage of rough diamonds.	<ul style="list-style-type: none"> ▪ Expanding DIL and making it the main purchasing arm of the cluster ▪ Increasing direct purchasing from mines to further reduce dependency on the DTC 	<ul style="list-style-type: none"> ▪ The DIL Board should drive the process and integrate other firms ▪ The Indian government should help, as buying rough diamonds can be a political process
Scaling up and formalizing diamond processing firms	There are too many small, informal firms with insufficient scale and low productivity in diamond processing	<ul style="list-style-type: none"> ▪ Create databases of firms to create information for possible consolidation ▪ Create missing subcontracting market where large processors are able to subcontract to smaller firms/individual cutters. Could utilize existing infrastructure of the Bourses or Diamond Industrial Park so that they become a marketplace for goods (diamonds) as well as B2B and labour. 	<ul style="list-style-type: none"> ▪ A strengthened Indian Diamond Institute could play the role of creating a database of diamond processors, drawing from the experiences of the GJEPC in collecting statistics. ▪ The mgmt of the Bourse or the Diamond Industrial Park would drive the extension of the spaces to house labour subcontracting

<p>Improving productivity of diamond processors</p>	<p>To compete with new competition from China, which has better manufacturing processes as well as abundance of cheap labour</p>	<ul style="list-style-type: none"> ▪ Increase formal training by setting up of a large diamond training facility in Surat ▪ Set up accredited laboratory in Surat and increase the level of applied research for the cluster e.g., how to do new fancy cuts that can be patented and create competition based on product differentiation ▪ Utilise international expertise in setting up of the laboratory and training facilities in order to benefit from technology transfers, otherwise the cluster will be limited to traditional cutting practices. 	<ul style="list-style-type: none"> ▪ Government could mobilize the cluster by investing in the setting up of the laboratory and training facility in order to jumpstart reciprocal investment by the larger diamond processors. ▪ The training facility and accredited laboratory to be run by diamond IFCs such as a strengthened Indian Diamond Institute. The IFCs should actively identify and bring in external/international expertise. ▪ GJEPC and other training/research insitutions in the gems and jewellery cluster should be consulted on how to run large scale training programmes and do applied research.
<p>Deepening the cluster</p>	<p>The cluster is too concentrated on processing and there are unexploited linkages with other clusters.</p>	<p>Developing a jewellery manufacturing industry using Gujarat processed diamonds by:</p> <ul style="list-style-type: none"> ▪ Creating linkages with the jewellery manufacturing cluster ▪ Tapping into the distribution networks of Indian jewellery ▪ Fostering demand for Indian-style gold/diamond jewellery 	<ul style="list-style-type: none"> ▪ The GJEPC should be responsible for linking the diamond and jewellery cluster as they have an oversight on both ▪ Marketing campaigns targeted at the Indian market should be put in place first by the GJEPC ▪ Then, the Indian government should help put in place internationally-focused marketing campaigns promoting Indian diamonds on Western-style jewellery
<p>Creating partnerships to capture more of the value-added</p>	<p>Diamond processing is a very low value-added part of the chain.</p>	<p>Moving downwards in the value chain through partnerships with:</p> <ul style="list-style-type: none"> ▪ Jewellery manufacturers that use low-end diamonds like watch manufacturers in order to secure sales ▪ Jewellery retailers like Walmart who would outsource diamond processing and jewellery manufacturing to Indian producers 	<ul style="list-style-type: none"> ▪ This should also be a collective effort, led by the large Indian diamond processing firms, through the GJEPC ▪ The Indian government should help with internationally-focused marketing campaigns promoting Indian diamonds on Western-style jewellery

Appendix 1: Description of Additional Elements in the Diamond Cluster

Source: Keyoor 2002, UNIDO, 2005, Vikas, NMCC, 2008, websites of the various cluster elements

Cluster Element	Description
Surat Hira Bourse, Surat	In addition to the already well established Bharat diamond bourse in Bombay, this bourse was set up in the year 1994 for promoting international trading of diamonds in Surat where most of the cutting actually takes place. Before 1994, manufacturers and traders had to depend on Mumbai supply, causing delay & additional security risk and limiting the growth of the diamond industry in Surat. The bourse was set up by the leading diamond merchants of Surat.
Diamond Industrial Park (DIP), Surat	The park was created by cluster participants in 2003 with funding from over 380 people (each paid Rs.5 lakh (\$11,100) non-refundable deposit.) It was incorporated as a co-operative but later registered as a company. It will house 1,000 firms when it becomes fully operational. The aim of the industrial park is to provide the best production infrastructure and also a customs bonded import and export zone for roughs and polished diamonds, bringing in industry players at every level of the process chain. The park is situated near the Surat airport. This park is set up in a total of 270-acre complex with 100 acres reserved for the export processing zone, which is open to all type of industries. Overseas buyers will get the widest of choices as export zone members can source goods and material from the domestic production area as well. In addition to this, goods from Surat's existing export zone could be brought under customs bond to the trading area for buyers to view. Currently there are 340 firms operational; due to its being in the outskirts of the city, firms have been shifting only slowly into the park.
Additional Information on The Gem & Jewellery Export Promotion Council	<p>GJEPC was set-up in 1966. This apex body of the cluster has over the years effectively moulded the scattered efforts of individual exporters to make the gem and jewellery sector a powerful engine driving India's export-led growth. It has 6,500 members spread all over the country. The role of GJEPC can be broadly classified under the following categories:</p> <p>I. Trade Facilitator</p> <p>The Council undertakes direct promotional activities like organising joint participation in international jewellery shows, sending and hosting trade delegations, and sustained image building exercises through advertisements abroad, publications and audio-visuals. GJEPC also invites countries to explore areas of co-operation in supply of rough diamonds and rough colored stones as well as offers co-operation in jewellery manufacturing. The Council regularly communicates with Indian Embassies, trade bodies and associations in various countries. And finally, GJEPC also organizes seminars, buyer-seller meets, symposiums. The Council provides market information to its members regarding foreign trade inquiries, trade and tariff regulations, rates of import duties, and information about jewellery fairs and exhibitions.</p> <p>II. Advisory Role to Government</p> <p>A crucial area of activity of the Council has also been aiding better interaction and understanding between the trade and the government. The Council takes up relevant issues with government and agencies connected with exports and submit documents for consideration and inclusion in the Exim Policy. The Council also grants membership, registration certificates and performs other roles as per the Exim Policy. India's Finance Minister tabled the Finance Bill (2007-2008) on 3rd May 2007. The major highlight of Finance Bill is the exemption of custom duty on Cut & Polished Diamonds. For the reduction in import duty of various Gem & Jewellery items, the GJEPC had made the Pre-Budget Proposals for the year 2007-08. The Government of India has now reduced the import duty on Roughs and Cut & Polished Diamonds from 3% to 0%. The exemption would boost the further growth of Indian</p>

	<p>Gem & Jewellery Industry and would bring the industry in line with other competitive countries.</p> <p>III. Nodal Agency for Kimberly Process Certification Scheme GJEPC works closely with the Government of India and the trade to implement and oversee the Kimberly Process Certification Scheme. To that effect, the Council has been appointed as the Nodal Agency in India under the Scheme.</p> <p>IV. Training and Research The Gems & Jewellery Export Promotion Council runs a number of institutes that provide training in all aspects of manufacture and design in Mumbai, Delhi, Surat and Jaipur. These training programs are being conducted to ensure that the Indian industry achieves the highest levels of technical excellence.</p> <p>V. Media and Information The Council also publishes a number of brochures, statistical booklets, trade directories and a bi-monthly magazine - Solitaire International, which is distributed internationally as well as to its members. Finally, the Council has also developed its own promotional audiovisual film - 'India - Your First Choice', which is dubbed in international languages and screened at trade shows.</p>
<p>Surat/Gujarat based IFCs (in addition to the Indian Diamond Institute)</p>	<p>Surat Diamonds Cutters Association (SDCA): This association lobbies on behalf of the industry with the government on various matters related to trade, commerce and investment</p> <p>Diamond Development Board (DDB): It was set up by the Government of Gujarat to co-ordinate the training and re-training of textile mill workers who are retrenched from mills, so that they can take up this profession of diamond cutting after retrenchment.</p>
<p>Training and Research Institutes outside of Surat/Gujarat</p>	<p>Gem Testing Laboratory, Jaipur. The laboratory was established in August 1972 under the founder Chairman of the Gem & Jewellery Export Promotion Council. The main functions of G.T.L. are to provide a Gem Certification service, conduct educational activities on gem related subjects and act as an information centre for researchers, R&D departments, customs departments, schools, colleges, journalists etc.</p> <p>The Gemmological Institute of India, Mumbai is the first non profit research and educational organisation in the field of Gemmology in India. It is a public institution founded by the Gem and Jewellery Exporters' Association, Bombay. The Institute was established in the year 1971 for the promotion propagation and development of the science of gemstones and research studies in India. The Gemmological Institute of India has set up a National Research Centre at Opera House. The Research Centre is being equipped with world class sophisticated instruments required for gemstones.</p> <p>Diamond and Gems Research Foundation (DGRF), Mumbai: The foundation which is now dormant has been promoted by the Diamond and Gems Development corporation and includes synthetic and colored stones as well under its domain of activities. This foundation had developed machines for cutting & polishing. There are reportedly some 20,000 such machines that are in operation in Tiruchirapalli. This has revolutionized the whole system of functioning in the industry.</p>

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