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Human Resource and Skill Requirements in the
Gems & Jewellery Sector (2022)

– A Report



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Human Resource and Skill Requirements in the Gems and Jewellery Industry

Study on mapping of human resource skill gaps in
India till 2022

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1. Environment Scanning and Competitiveness of the Gems and Jewellery sector

1.1. India in the Global Context

The size of the global Gems and Jewellery industry was estimated at US \$ 146 billion at retail prices in 2005, and is estimated to have recorded US \$ 170 billion in sales in 2008. The industry has grown at an average Compounded Annual Growth Rate (CAGR) of 5.2% since 2000.

India is one of the eight key world markets, the others being the USA, UK, Middle East, Turkey, Japan, Italy and China. India is the also the largest consumer of gold in the world, and is estimated to hold nearly 16,000 tonnes of gold, accounting for nearly 12-15% of the world's cumulative 'above ground' gold stocks. India is also the largest diamond cutting and polishing centre in the world.

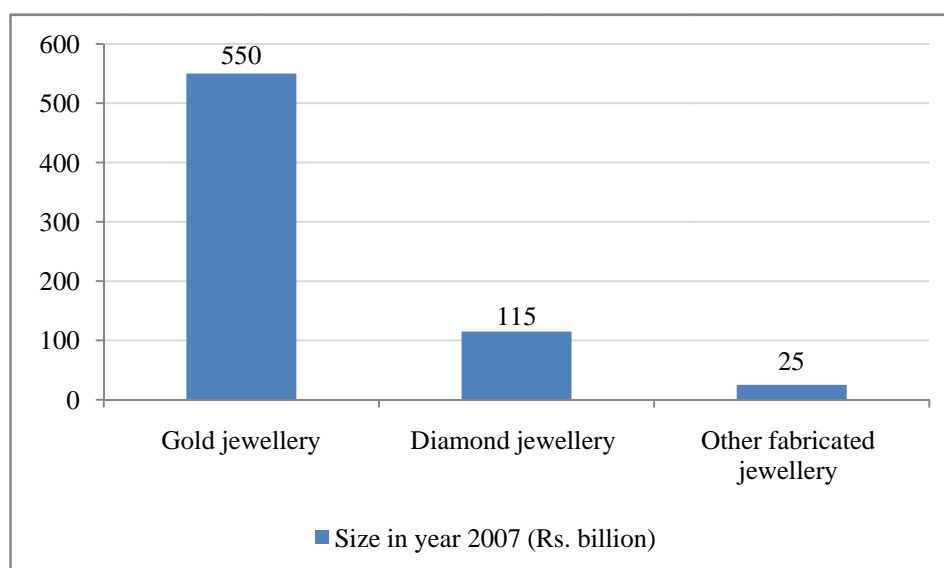
While a predominant portion of gold jewellery manufactured in India is for domestic consumption, a significant portion of rough, uncut diamonds processed in the form of either polished diamonds or finished diamond jewellery is exported.

The manufacturing and processing of Gems and Jewellery is distributed across several countries in the world (i.e., the African continent dominates the mining space of diamonds whereas India is the dominant player in diamond processing). Apart from being a major market, India primarily forms a part of the polishing and jewellery manufacturing part of the industry's value chain in addition to increasing traction in the organised retail of jewellery.

1.2. Industry size and Growth of the Gems and Jewellery Sector

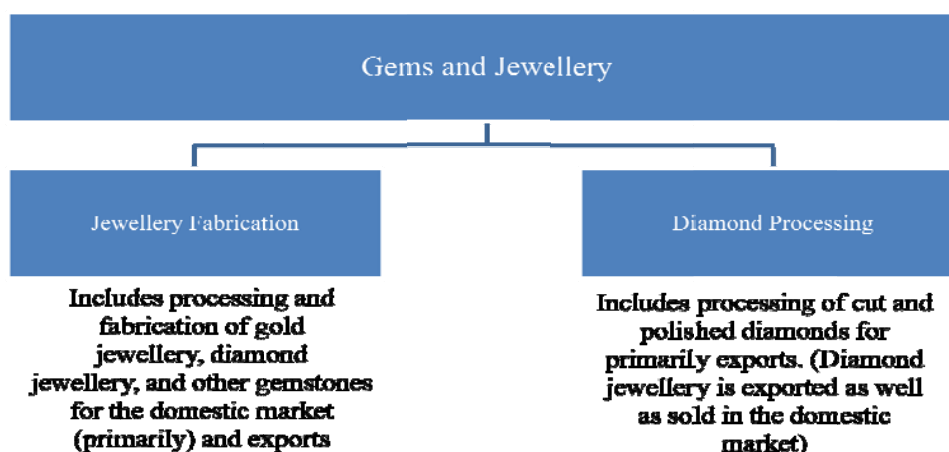
The domestic demand for gold jewellery was estimated at Rs. 550 billion in 2007, accounting for an estimated 80% of the Indian jewellery market of Rs. 690 billion; the balance comprised of diamond jewellery (Rs. 115 billion), and other fabricated jewellery (Rs. 25 billion), as seen below:

Figure 1: Size of Retail Market in India



The Gems and Jewellery industry has grown at a rate of 10% between 2000 and 2006.

Figure 2: Key processes in the Gems and Jewellery industry



The two major segments in India are gold and diamonds. India dominates the gold and silver consumption globally with consumption of about 800 tonnes per annum (about 22% of the world’s consumption in 2008). The industry provides employment to around 3.2 to 3.4 million¹ people directly. India dominates the diamond processing trade with 11 out of 12 diamonds being cut and polished in India. Diamond processing in India primarily consists of production of cut and polished diamonds (CPDs) and jewellery fabrication. Diamond jewellery forms a small part of the overall market in India and CPDs is mainly exported.

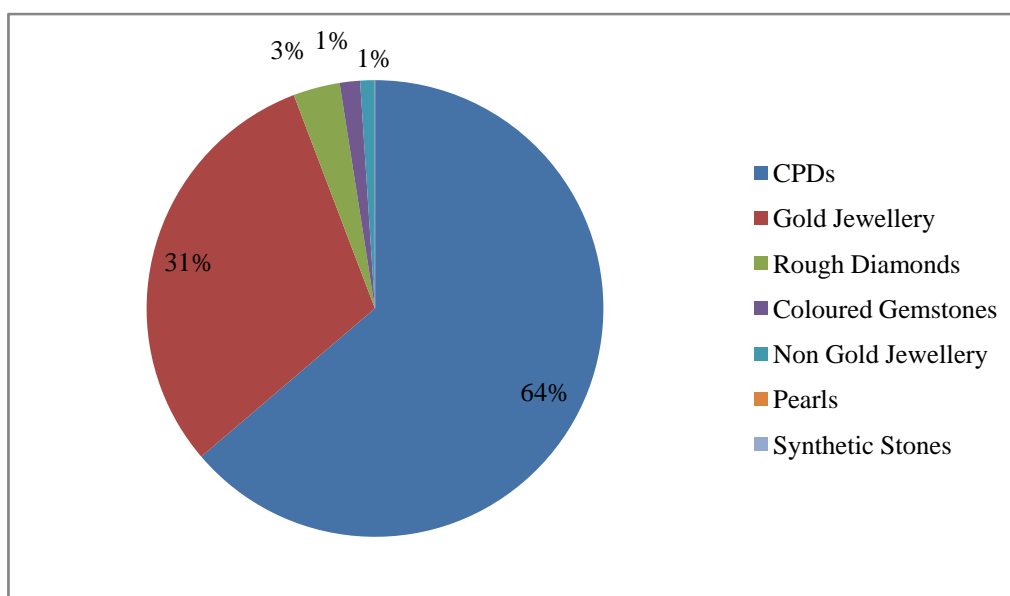
¹ GJEPC study on employment in Gems and Jewellery industry of India

The industry is characterised by highly unorganised trade, labour intensive operations, working capital and raw material intensiveness, price volatility of gold and export orientation. Though India plays a dominant role in the Gems and Jewellery industry in terms of processing and consumption, its role in the mining of gold and diamond is minimal. India imports gold and rough diamonds along with other precious metals.

The Gems and Jewellery industry also plays a key role in the Indian economy, and commands a high percentage of the exports from the country. In 2008, Gems and Jewellery exports accounted for about 12% of India's total exports. The growth of exports between 2002-03 and 2007-08 was about 14% amounting to Rs. 837 billion in 2008.

As seen in the graph below, the exports of CPD and gold jewellery make up about 95% of the total exports of Gems and Jewellery from India, with CPDs alone accounting for about 64% and Gold Jewellery accounting for about 31%.

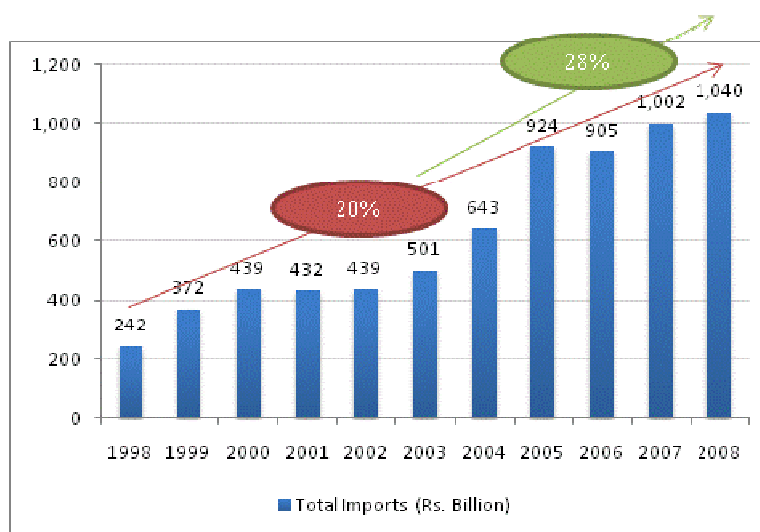
Figure 3: Proportion of Exports of CPDs, Gold Jewellery and Others



Source: GJEPC and IMAcS analysis

Similarly, India's total imports of pearls, precious, and semi precious stones, and gold and silver have been steadily growing over the years with a CAGR of about 20% between 1998 and 2008. At the same time, the growth of imports in recent years has increased with a five year CAGR (2002-03 to 2007-08) of about 28%.

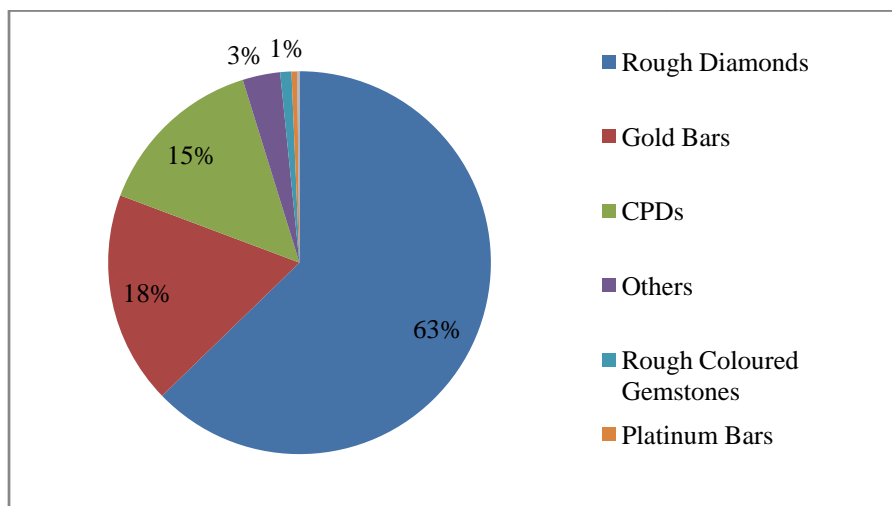
Figure 4: Growth of Imports of Gems and Jewellery into India



As seen in the graph below, the imports of rough diamonds and gold bars make up about 81% of the total jewellery imports into India, with rough diamonds alone accounting for about 64%.

Most of the rough diamonds are processed and re-exported. The gold is made into jewellery and is primarily sold in the domestic market.

Figure 5: Proportion of Imports of Rough Diamonds, Gold Bars and Others



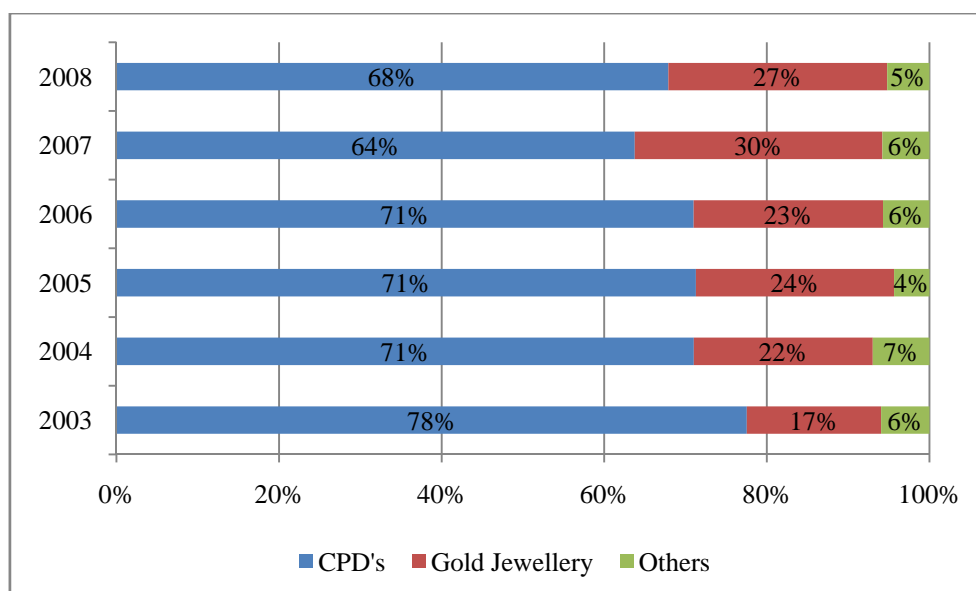
1.2.1. Various segments of the Gems and Jewellery sector

The segments of the Gems and Jewellery sector in India are broadly classified into Jewellery Fabrication and Diamond Processing.

- **Jewellery Fabrication²:** Jewellery fabrication primarily refers to the fabrication of gold jewellery and diamond jewellery. While a predominant portion of gold jewellery manufactured in India is for domestic consumption, a significant portion of rough, uncut diamonds processed in India in the form of either polished diamonds or finished diamond jewellery is exported.
- **Diamond Processing:** The Indian diamond processing industry took roots in the 1960s. As compared with the traditional diamond cutting & polishing centres of Belgium, India, with its low labour cost, opened up new possibilities for the world diamond industry by making diamonds affordable for new, less affluent buyers. As a result, India captured an increased proportion of this market, and at present, India is the world’s leading diamond cutting and polishing centre. India produces around 95% of the world’s cut and polished diamond pieces. By carat weight, India is estimated to process 80% of world rough production by volume and 58% by value. While Belgium and Israel dominate the cutting and polishing of larger-sized and larger-value diamonds (over 0.5 carats), India dominates the lower-sized, lower-value market (less than 0.5 carats).

Diamond processing and jewellery fabrication make up over 90% of the total Gems and Jewellery exports:

Figure 6: Share of various segments of the Gems and Jewellery sector (exports)



Also, the growth rates of the segments are as below:

² Ibid.

Table 1: Growth rates of various segments of the Gems and Jewellery Sector

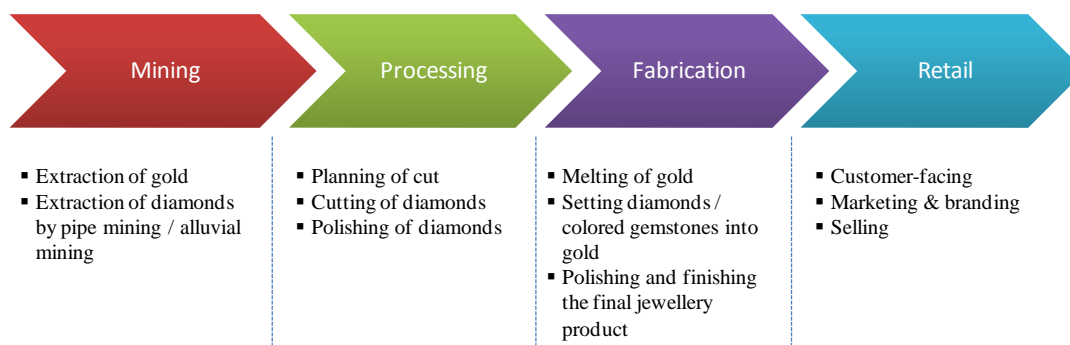
Segment	Contribution to Total Gems and Jewellery Exports	Growth rate of Exports (CAGR% between 2002-03 to 2007-08)
Diamond Processing (CPD)	64%	11%
Jewellery Fabrication	31%	25%

Source: ICRA Sector Report on Indian Gems & Jewellery Sector (July 2008), IMAcS analysis

1.3. Value chain of the Gems and Jewellery sector

The overall value chain of the Gems and Jewellery sector is as depicted below:

Figure 7: Value chain of the Gems and Jewellery sector



The key activities in Gems and Jewellery Fabrication and Diamond Processing are as below:

Figure 8: Jewellery Fabrication and Diamond Processing

The activities in the value chain of the Gems and Jewellery sector are as explained below³:

- ***Mining:*** The first stage in the value chain of the Gems and Jewellery Industry is mining, i.e. the extraction of gold/diamonds from their natural deposits. Diamonds are typically mined by pipe mining or by alluvial mining. Pipe mining refers to the extraction of diamonds from volcanic pipes, while alluvial mining involves the extraction of diamonds from riverbeds or ocean beaches. Gold mining consists of the processes and techniques employed in the removal of gold from the ground and there are several techniques by which gold may be extracted from the earth.
- ***Diamond/Gemstone Processing:*** Diamond cutting and polishing requires anywhere from several hours to several months to complete. During this process, a diamond loses, on average, half of its original weight. A mined diamond stone first needs to be planned for cutting – i.e. it is carefully examined by the cutter and then marked for cutting. In the polishing process facets are ground on to the stone. A facet is the tiny plane or surface that traps the light and makes a diamond sparkle. Most diamond cuts have 58 facets.
- ***Jewellery Fabrication:*** Nearly two thirds of the world supply of gold is currently used for jewellery fabrication. Under this step, gold is first manipulated, i.e. it is melted, bent, cut and shaped in a way so as to create jewellery designs. This is followed by the casting process, which may be a manual or machine-aided. The setting process follows casting, and is the

³ GJEPC Report on The Global Gems and Jewellery Industry – Vision 2015

process in which diamonds/coloured gemstones are set into the gold metal. Jewellery fabrication ends with the polishing/finishing process – at the end of this process, the jewellery is ready to be sold.

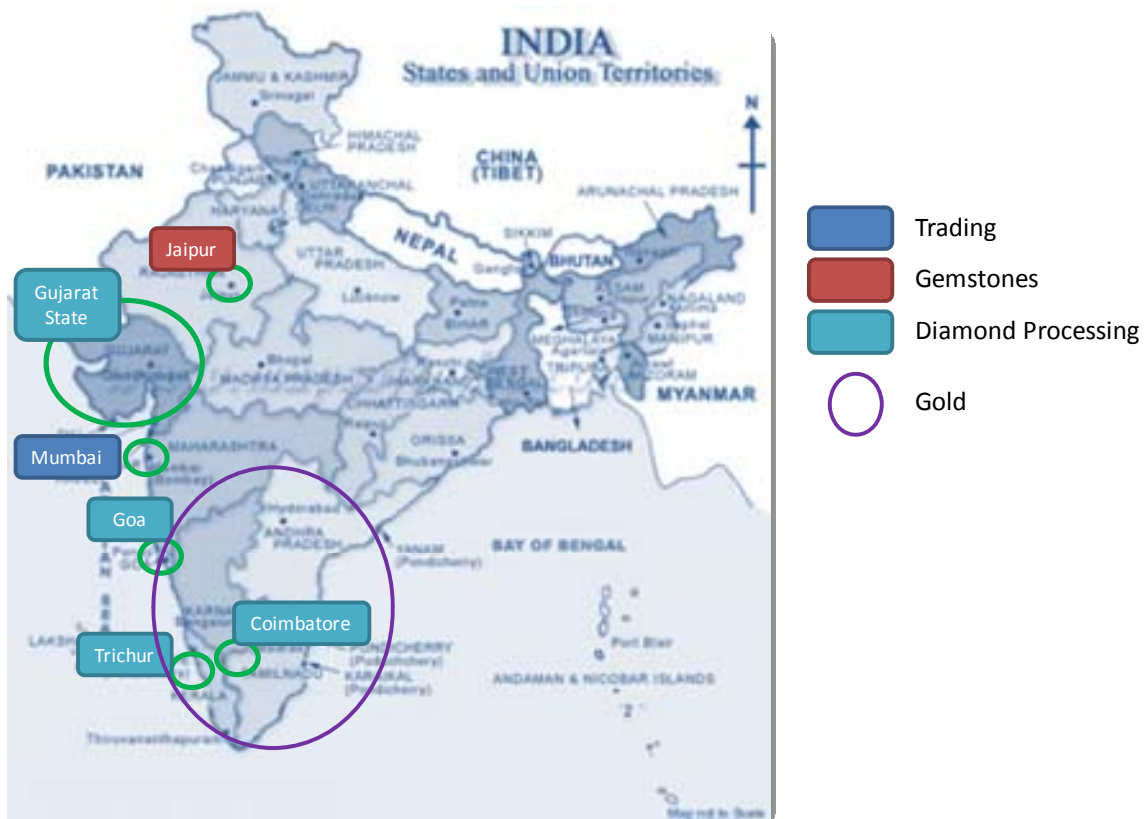
- **Jewellery Retail:** This is the end-customer facing process in which finished jewellery is sold to the end customer. In India, jewellery retail is typically done by small to middle sized family retailers, but this trend is changing with the advent of large retailers such as Tanishq.

1.4. Market Structure of the Gems and Jewellery sector

1.4.1. Major Production Clusters

A geographical map of the Gems and Jewellery clusters in India is as shown in the following figure:

Figure 9: Geographical Map of Gems and Jewellery Clusters in India



The centre of the trade in India’s Gems and Jewellery industry is Mumbai. Most imports of gold and rough diamond arrives in Mumbai. However, most of the processing of diamonds takes place in the

neighbouring state of Gujarat. The Gems and Jewellery clusters in Gujarat are as shown in the following figure.

Figure 10: Gems and Jewellery Clusters in Gujarat



Gujarat alone accounts for an estimated 80% of the diamonds processed in India. Of this, 90% are processed by diamond units located in and around Surat alone. The rest of the diamond units are located in Ahmedabad, Palanpur, Khambhat, Rajkot, Bhavnagar, Valsad and Navsari.

The diamond processing industry has spread from Gujarat to other states. Many diamond processing units have been set up in Mumbai in Maharashtra. There are also jewellery units in *Trishur in Kerala*, *Coimbatore in Tamil Nadu*, *Jaipur in Rajasthan*, and *Goa*. Mumbai continues to be the main diamond trading centre of India accounting for the dispatch of 93% of diamond exports.

1.4.2. Major Players⁴

A brief profile of major players in the Indian Gems and Jewellery Industry is as below:

- **Rajesh Exports Limited:** Rajesh Exports Limited (REL) headquartered in Bangalore manufactures gold and diamond jewellery. REL exports its products world-wide and distributes them within India to the wholesale jewellery market. REL also retails its products through its own network of retail jewellery showrooms Shubh Jewellers and Laabh Jewellers spread across India. The design portfolio is divided in to three basic types of products: Asian Jewellery, Western Jewellery and Diamond Jewellery. The company's products include

⁴ Source: The reference for this section are respective company websites, Google Finance, Business Week

earrings, rings, pendants, chains, necklaces, bracelets, necklace sets and bangles. Rajesh Exports Limited (REL) also acquired the leading Indian branded jewellery retailer Oyzterbay in 2006.

- ***Gitanjali Group:*** The Gitanjali Group was founded as a single company cutting and polishing diamonds for the jewellery trade at Surat, Gujarat, in 1966. It has become a pioneer among major diamond and jewellery houses. The Group has abandoned jewellery trade convention by launching multiple brands for multiple markets and price segments – brands include Nakshatra, D'damas, Collection g, Asmi, Sangini and Gili. It opened up distribution via superstores, department stores and other retail outlets at MRP, supported by international certifications of scientifically tested purity and authenticity, across India and in the world's jewellery capitals. Operations of the Gitanjali Group span the globe, all the way from USA, UK, Belgium, Italy and the Middle East to Thailand, South East Asia China, and Japan.
- ***Su-Raj Diamonds & Jewellery Ltd.:*** 'Su-Raj' is derived from contraction of two names viz. Suresh and Rajnikant, the founders of Su-Raj Group in the early Sixties. The company offered its shares to the public in the year 1986 and became the first company in the industry to opt for public issue in India. This was a unique step in an industry where traditional business environment exists. The company's operations are universal in scope and global in spread covering all facets of diamond and jewellery manufacture and trading in rough and polished stones, at all key locations worldwide.
- ***Suashish Diamonds Ltd.:*** Suashish Diamonds Ltd was incorporated in October 1988. Suashish is unique in the diamond industry as it is one of the few players that have activities across value chain thereby retaining higher margins. Its business activities include sourcing of rough diamonds to retailing finished diamond jewellery through its retail jewellery brand "Ishi's". Suashish has employed cutting edge technology throughout its diamond and jewellery manufacturing processes. It has subsidiaries and strategic partnerships in all major markets.
- ***Shrenuj & Co. Ltd.:*** Shrenuj & Company Limited and its subsidiaries engage in the manufacture and sale of diamonds and jewellery in India and internationally. The company operates in two segments, Diamonds and Jewellery. The Diamonds segment engages in cutting and polishing of diamonds. This segment offers polished diamonds in full cut and single cut rounds, as well as in fancy shapes, such as princess, baguettes, marquise, pear, oval, emerald, and heart in various colours and clarities. The Jewellery segment provides diamond

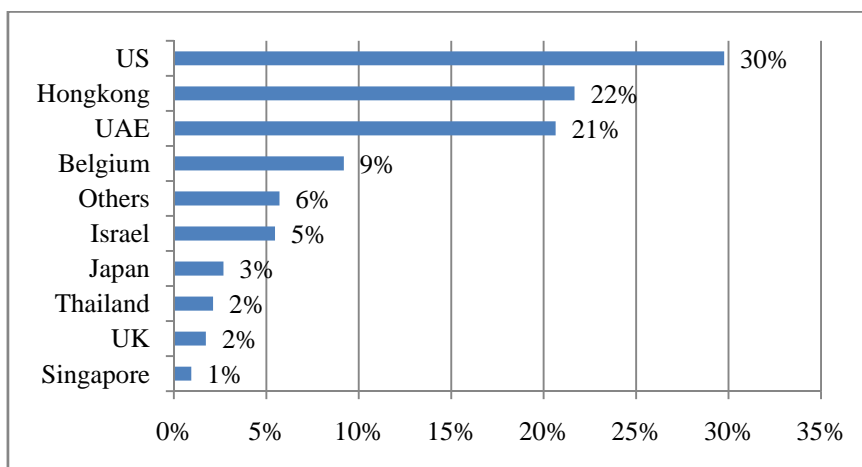
studded gold/platinum jewellery. The company was founded in 1906, is based in Mumbai, India and employs about 3,000 employees.

- **Tanishq:** Tanishq is one of India's leading jewellery brands. Started in 1995, Tanishq is the jewellery business of Titan Industries Ltd - promoted by the TATA group. Tanishq has set up production and sourcing bases with through research of the jewellery crafts of India. Tanishq today is India's most aspirational fine jewellery brand with 91 stores in 64 cities, with an exquisite range of gold jewellery studded with diamonds or coloured gems and a wide range of equally spectacular jewellery in 22Kt pure gold. Exquisite platinum jewellery is also part of the product range.
- **Hindustan Diamond Co. Pvt. Ltd.:** Hindustan Diamond Co. (HDC) is a 50:50 joint venture between the Indian government and De Beers, the world's leading diamond company with expertise in the exploration, mining, and marketing of diamonds. HDC is an associated member of the Diamdel network. The company is one of the largest diamond companies in India. De Beers India and HDC entered into the MoU in 2004 whereby HDC subscribed for 26% in De Beers India by investing US\$ 3.75 million in De Beers India. HDC has offices in Mumbai and Surat.
- **Vaibhav Gems Ltd:** Vaibhav Gems Limited (VGL) was incorporated in Jaipur in 1989. With a very small beginning, VGL is the largest exporter of coloured gemstones from India, and also the one of the largest exporters of studded jewellery. The company produces gemstones, diamonds, jewellery and chains.
- **Asian Star Co Ltd:** Asian Star Company Limited is one of the world's leading diamantaires and a Diamond Trading Company Sightholder. It was listed on the Bombay Stock Exchange in 1996. Headquartered in Mumbai, the product portfolio includes Polished Diamonds and Jewellery for the domestic and international market. The company employs more than 1,700 professionals and skilled workers and has manufacturing centres at Surat and Mumbai. The company also has a strong global presence with 24 marketing arms spread across the continents of Asia, Europe, and America.

1.4.3. Major Export Markets

The destination-wise share of exports of Gems and Jewellery from India is shown in the following figure. The total value of exports of Gems and Jewellery was about Rs. 791 billion⁵ in the year 2008. Exports to USA and Hong Kong alone account for over 50% of the exports of Gems and Jewellery from India.

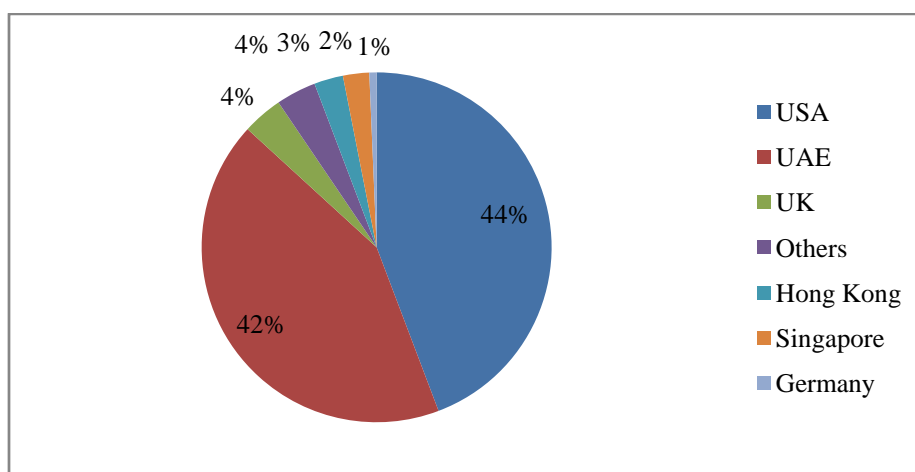
Figure 11: Destination-wise Share of Exports of Gems and Jewellery from India (2008)



Source: GJEPC and IMAcS analysis

The destination-wise share of exports of gold jewellery from India is as below. The total value of exports of gold jewellery was Rs. 235 billion in the year 2007. Exports to USA and UAE alone account for about 87% of the exports of gold jewellery from India.

Figure 12: Destination-wise Share of Exports of Gold Jewellery from India (2007)



Source: GJEPC and IMAcS analysis

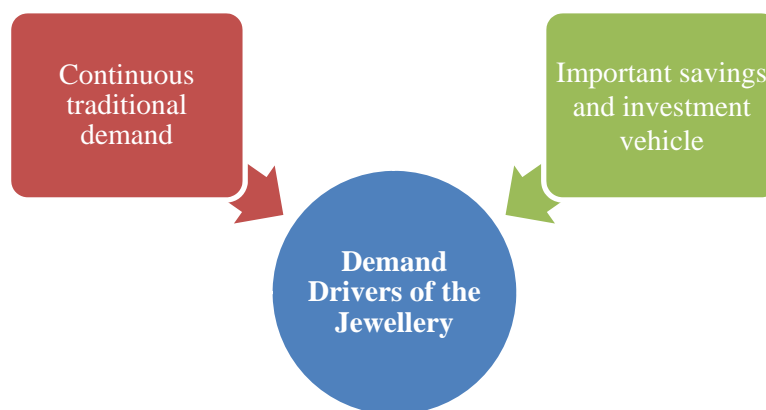
⁵ GJEPC

1.5. Demand Drivers of the Gems and Jewellery sector

1.5.1. Demand drivers of the Jewellery Segment

The demand drivers for the jewellery fabrication segment are as below:

Figure 13: Demand drivers for the Gems and Jewellery sector



- **Continuous traditional demand:** Jewellery is an important constituent of the Indian culture. Traditionally in India, the demand for gold and diamond jewellery is driven by festivals and weddings and there is remarkable historical and religious significance too. India is also the largest consumer of gold in the world. In marriages, gold jewellery is the gift preferred by the near relatives of the bride and the groom. Gold jewellery is very popular among farmers, with an upsurge in gold sales after a good agricultural season. Buying of gold is an important part of every stage of an Indian citizen's life. Given the Indian culture, this stream of demand is thus continuous and is only expected to rise going ahead.
- **Important savings and investment vehicle:** Apart from its religious and social significance, gold is valued as an important savings and investment vehicle in India, and is the second preferred investment behind bank deposits. This can also be attributed to the fact that gold is highly portable, holds its value well in times of uncertainty and can be easily converted to cash either through sale or for guarantying loans.

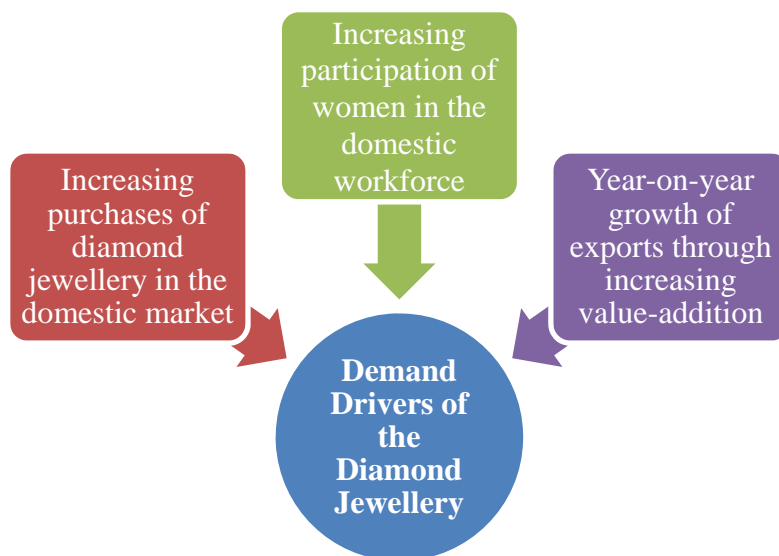
Further, the emergence of use of jewellery as a *fashion statement* as well as for *daily use* and *gifting* has fuelled demand growth in the Gems and Jewellery sector.

Apart from this, the increasing share of diamond jewellery is explained below.

1.5.2. Demand drivers of Diamond Jewellery

The demand drivers for the diamond processing and jewellery sector are as below:

Figure 14: Demand drivers for Diamond Jewellery



- **Increasing acceptability of diamond jewellery in the domestic market:** Traditionally, jewellery in India has mainly been gold jewellery. Diamond jewellery is lesser accepted in India due to factors such as myths associated with diamonds being unlucky in certain instances and the higher cost of diamonds. This is now changing with an increased acceptance of diamond jewellery in the domestic market.
- **Diamond as a fashion statement for the affluent:** Diamond jewellery is increasingly serving as a fashion statement for the affluent to differentiate themselves from others wearing traditional jewellery/gold jewellery.
- **Increasing affordability:** Employment of women in the workforce has been increasing due to the changing mindsets and increasing education levels among women. This has resulted in women having more impact on the purchase decisions; and women having also started purchasing jewellery for themselves as against earlier trends of jewellery purchase being primarily a family decision. Increased disposable income for working couples and lifestyle changes have aided this.
- **Exports as a driver:** As seen earlier, exports have been growing year-on-year and the 5 year CAGR (2002-03 to 2007-08) is about 13%. India currently produces around 95% of the world's cut and polished diamond pieces. By carat weight, India is estimated to process 80%

of world rough production by volume and 58% by value. India is also now increasing its presence in the larger diamonds space.

- **Value addition from processing to jewellery:** Though India processes a large number of diamonds, most of them are re-exported after polishing. There exists scope to increase value addition through setting into jewellery (jewellery fabrication).

1.6. Drivers of competitiveness of the Gems and Jewellery Sector

- **Industry standards, certification, and hallmarking:** By and large, the Gems and Jewellery industry in India has been indifferent to the adoption and establishment of formal or informal industry standards. However, as the industry has grown and more and more businesses have started transacting on a global basis, a need has arisen for establishing standards. However, in India, one of the largest markets for precious jewellery, quality standards are conspicuous by their absence. Hallmarking is restricted to a minor portion of sales, with the bulk of the consumers unaware of the exact caratage of the jewellery they buy. It is expected that the industry will see an increasing level of adoption of hallmarking in gold and certification in gemstones and this is critical to its competitiveness.
- **Processing of larger size diamonds:** The Indian Gems and Jewellery industry has been built on polishing lower size and quality stones. Looking forward, since India already enjoys domination in the world CPD market in general, and for smaller-sized diamonds in particular, the scope for significant increase in market share and growth in the traditional small-size diamond exports is limited. Industry leaders are now seeking further growth through processing of larger size stones, and manufacture of diamond jewellery. Indian industry can now increasingly process the full range of sizes and qualities of stones utilising not only a cheap and abundant workforce, but also advanced technologies. Future growth is likely to be largely driven by the cutting and polishing of medium and large stones (currently dominated by Belgium and Israel), with consequently higher unit realisations. The Indian Gems and Jewellery GJ industry is already reporting increased growth in the larger-size segment. Export data from the GJEPC also reports a gradual shift in Indian exports to higher value segments, reflected in higher per carat realisations. Larger-sizes command higher per carat realisations and profits.
- **Availability of labour at competitive wages:** Labour is a critical component in the value chain of the Gems and Jewellery sector. Labour in India, as compared to other countries, is cheap, and India thus stands at an advantage over its global competitors in this industry. Availability

of skilled manpower is a key strength that has enabled growth in India’s Gems and Jewellery sector. India has a large pool of skilled artisans with vast traditional knowledge and expertise in jewellery making. It also has the largest resource pool in diamond cutting and processing. India also has a good blend of technically trained designers who are well-versed in latest 2D and 3D design software. India also has one of the lowest costs in diamond cutting.

- **Government Support:** The Indian Government has supported the Indian Gems and Jewellery sector with policies such as waiver of customs duties on the import of rough diamonds, permission for personal carriage of jewellery through Hyderabad and Jaipur Airport as well, in addition to Delhi, Mumbai, Kolkatta, Chennai and Bangalore, establishment of Gems and Jewellery SEZs, etc. This continued support is critical to the competitiveness of this industry.

Figure 15: Drivers of competitiveness of the Gems and Jewellery Sector

Sources of competitive advantage	Segments	
	Diamond Processing	Jewellery Fabrication
Industry standards, certification and hallmarking	C	C
Processing of larger size diamonds	C	
Availability of labour at competitive wages	C	C
Government Support	C	C

 - Critical

1.7. Key Success Factors and Risk Factors of the Gems and Jewellery sector

1.7.1. Key Success Factors

- **Movement from unbranded to branded jewellery and increase in fashion dictated buying:** Over 90% of the jewellery sold in India, is mainly sold by traditional “family jewellers” and the unorganised sector contributes to about 96% of the total jewellery sales in the country. Thus, currently the Indian market remains highly fragmented. This scenario is seen to be

changing, though slowly, with the entry of players such as Tanishq and Gitanjali, and the trend of supermarkets like Lifestyle and Shoppers Stop having jewellery outlets.

- **Hallmarking and Certification:** Increasing consumer awareness and need for certification by BIS and hallmarking have served as a means for firms to differentiate themselves in the market.
- **Increased use of technology:** The Gems and Jewellery business had traditionally involved a large content of manual labour. Though this still remains the case, a greater use of technology is seen in this industry. For example, factories have started using more machine-made designs, laser soldering is replacing manual soldering, investments in modern manufacturing and quality systems is increasing, etc.
- **Transformation from family owned businesses to professionally managed businesses:** Traditionally in India, the majority of India's diamond workforce is employed by small units that process diamonds on a job-lot basis. At the low-end, family units processes diamonds/ make jewellery. Even at the retail end of the value chain, people in India generally buy jewellery from their 'family jewellers'. This structure makes it less possible to bring in professionalism into the industry, which will be key going ahead given the threats from other diamond processing/jewellery making nations. Thus for firms in the Indian Gems and Jewellery sector to prosper, a transformation from family owned businesses to professionally managed businesses is critical.

1.7.2. Key Risk Factors

- **Limited Standardisation:** In India, jewellery consumption is primarily of gold. The bulk of the Indian jewellery buying is still rooted in tradition, and jewellery is sold in traditional designs. Gold jewellery is also bought as an investment. In the present system of selling gold jewelerrry in India, the purity may or may not be standard and the buyer can lose - cheating on caratage (and purity) is widespread.
- **Possible Long-Term Threat from China:** Although India currently enjoys dominance in the world's cut and polished diamonds market, China may emerge as a viable rival, if not in the near term, certainly in the longer term. An increasing number of diamond processors from Israel and Belgium, and even India, are setting up facilities in China, for reasons like the cheap and disciplined labor force, significant increase in potential consumers in the high-income segment within the country and the steadily improving quality of Chinese

workmanship. Technology is another area where the Indian industry faces a long-term threat from China.

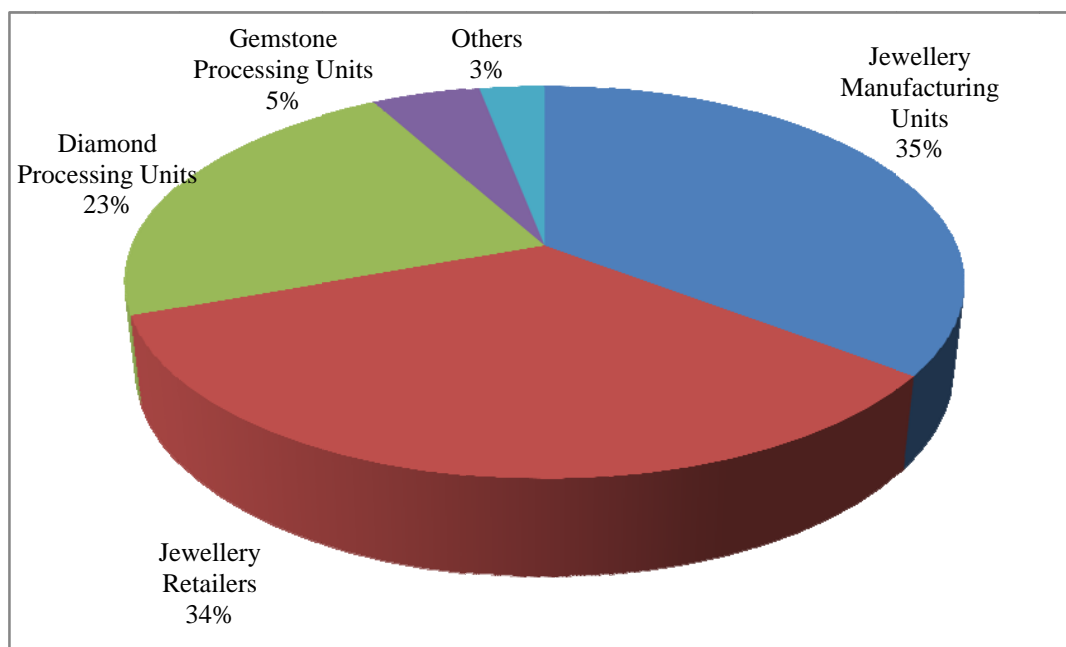
- **Threat from Polishing in Producing Nations:** The preference for polishing diamonds in the producing countries has been seen to be growing. There has been increased political pressure by major diamond producing countries in Africa to gain further economic benefits from diamond production through jobs creation in a domestic cutting and polishing industry.

2. Human Resource and Skill Requirements in the Gems and Jewellery Sector

2.1. Current employment pattern

The bulk of the Gems and Jewellery industry in India is concentrated in the unorganised sector and employs an estimated 3.2 to 3.4 million people directly⁶. It is also estimated that 94% of the global workers involved in the diamond industry are in India. Due to the economic recession during 2008-09, more than 100,000 skilled and unskilled workmen have been laid-off due to poor demand. However, it is expected that this will be only a blip in the long term outlook.

Figure 16: Breakup of employment in Gems and Jewellery sector in India



Source: GJEPC, Primary research, and IMAcS analysis

⁶ GJEPC study on employment in gems and jewellery industry of India

2.1.1. Functional distribution of human resource

Our interactions with representatives from the Gems and Jewellery industry reveal that a significant proportion of the workforce is involved in manufacturing operations (jewellery fabrication and cutting/polishing activities), followed by functions such as QC and other support functions such as HR, administration, finance, etc.

In the CPD segment, most personnel are engaged in the cutting and polishing manufacturing operation, while in the jewellery fabrication segment, most personnel are engaged in the setting (wax setting / metal setting), grinding and assembly and finishing / polishing operations.

Table 2: Functional distribution of human resources across the CPD segment

Function	Distribution	
Procurement	1%	
Processing	Planning of cut	8%
	Cutting	5%
	Polishing	70%
	Grading	5%
Trading / Sales	1%	
HR, Admin, Finance, Senior Management, Other support functions	10%	

Source: Primary research and IMaCS analysis

Table 3: Functional distribution of human resources across the jewellery fabrication segment

Function	Distribution	
Design	2%	
Fabrication	Model Making	3%
	Waxing	8%
	Setting (wax / metal)	25%
	Casting	5%
	Grinding & Assembly	15%
	Finishing / Polishing	15%

Function	Distribution
QC	10%
Export / Retail	3%
HR, Admin, Finance, Senior Management	10%
Support	4%

Source: Primary research and IMaCS analysis

2.1.2. Distribution of human resource by education level

The following table represents the education-wise break-up of people across various segments of the Gems and Jewellery sector in India. As seen, most of the persons employed in the gems and jewellery sector in India are minimally educated and most have studied till 10th standard or below.

Table 4: Distribution of human resource by education level

Sub-segment	Cut and polished diamonds (CPD)	Jewellery Fabrication
Ph. D/ Research	-	-
Engineers	0-1%	0-1%
Diploma or equivalent certification by other agencies	0-2%	0-2%
ITI and other vocational courses	0-2%	0-2%
Other graduates	0-5%	5-10%
CA/MBA/etc.	0-5%	5-10%
10th standard	8-10%	25-30%
Below 10 th standard	70-75%	40-45%

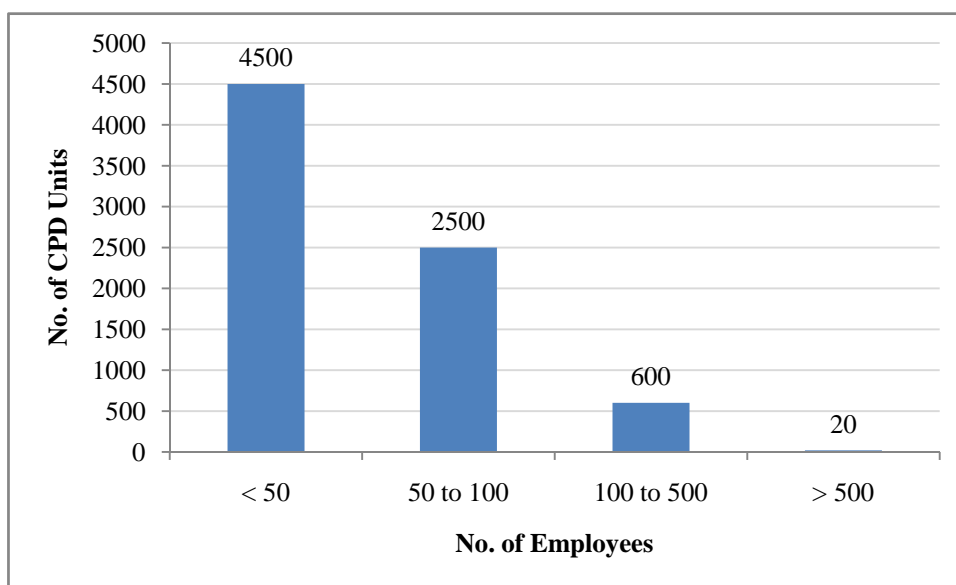
Source: Primary research and IMaCS analysis

2.1.3. Major regions of employment concentration⁷

⁷ Reference: GJEPC study on employment in gems and jewellery industry of India

There are different clusters within India in which majority of the employment in the Gems and Jewellery industry is concentrated. In the case of the CPD segment, it is seen that majority of the CPD activity is based out of the state of Gujarat, with the bulk of the activity happening in Surat. It is estimated that the Surat cluster itself employs around 6 lakh persons, with an additional 2 lakh persons working on CPD in the rest of Gujarat⁸. Most of the CPD units in Surat are small scale and about 92% of the units employ less than 100 people, with around 60% of the units employing less than 50 persons, as seen below:

Figure 17: No. of CPD units and employment in Surat



Considering jewellery manufacturing, some of the important clusters are: Delhi, Rajkot, Ahmedabad, Mumbai, Kolkata, Thissur, Chennai, Madurai, Coimbatore and Hyderabad. Around 58% of the employment is direct. In jewellery retail it is estimated that there are approximately 3 to 4 lakh retail outlets in India. These are primarily run by family-owned businesses and organised retail accounts for only a small proportion. It is estimated that most retail shops have less than 5 employees. Jewellery retail has a strong presence in the metros.

⁸ Based on inputs received in the primary survey

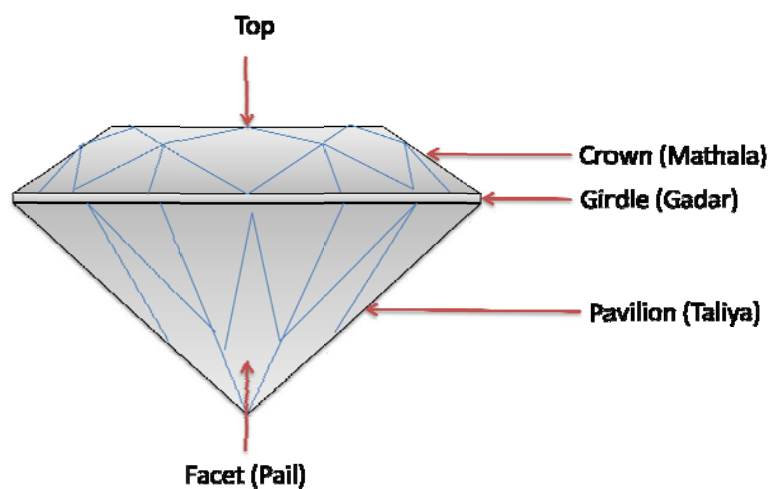
2.2. Skill requirements and skill gaps in the Diamond Processing segment

2.2.1. Value chain in the CPD segment (Diamond Processing segment)

In this section, we will reiterate and further detail the value chain in the CPD segment to set the context for the section on skill requirements and gaps in this segment. During the course of this discussion, it is required to understand various terms used while referencing the CPD activity which includes ‘operations’ on different parts of a diamond.

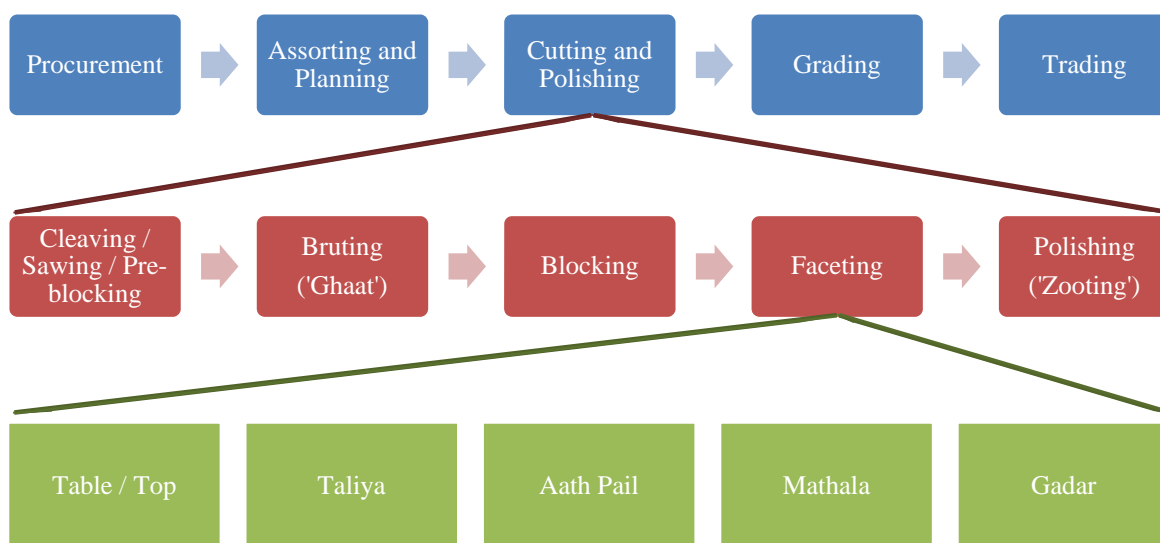
The nomenclature used while referring to the different parts of a diamond is as below:

Figure 18: Diamond structure



The value chain within the CPD segment can be represented and described as below:

Figure 19: Value chain within the CPD segment



- Procurement:** This refers to the obtaining of rough diamonds by CPD manufacturers. India has traditionally been procuring and processing the small size diamonds (generally 0.5 to 25 points⁹), though this trend is now changing and large size factories have started procuring larger size diamonds (40 to 50 points). Generally many of the players in diamond clusters like Surat have an office in Mumbai – personnel at the Mumbai office track what is selling the markets they cater to, the demand in these / other markets, what is being done by competitors etc. Based on this, personnel from the CPD units / personnel from the Mumbai office of the CPD units visit the place where rough diamonds are mined and kept (say one of DTC’s units) and select the products they want to place an order for. Rough diamonds are mainly imported through Mumbai, cleared through the customs clearing house (where consignments are opened, check and resealed) and then couriered to the site location of individual factories (say, in Surat). Players import rough diamonds individually.
- Assorting and Planning:** Assorting refers to the categorisation of rough diamonds into different types, while planning refers to determining how a diamond needs to be cut so as to get the maximum yield / maximum value from the rough diamond. Planning is one of the most critical aspects in the value chain of the CPD segment. Planning may be done manually or by using planning machines and software (with basic knowledge of computer operation) – for example, the Sarin or Helium Technologies. Procured rough diamonds are mainly of two types – “make-able” diamonds (i.e. rough diamonds that can directly polished) and rough diamonds that need to be first planned and cut before faceting / polishing. Rough diamonds

⁹ 1 carat = 100 cents or 100 points

thus need to be sorted on the basis of whether they are makeable or not, on the basis of colour, size etc. Non-make-able diamonds then need to be planned so as to reduce wastage (typical wastage is 30 to 70%) and maximise yield.

- **Cutting and Polishing:** Once planned, the diamond is cleaved/sawed, i.e. it is first cut into one or more pieces based on the plan. Cutting may be done by each company/cut diamonds may be procured from smaller companies that do only sawing work on job lot basis. Cutting may be done by laser machines or by blade sawing machines by placing the rough diamonds in ‘dops’ or cup-shaped holders. The use of laser machines has been on the rise. A rough comparison between laser machines and blade sawing machines is as below:

Table 5: Comparison between Laser Machines and Blade Sawing Machines

Machine Type	Approximate Price	Time taken to cut a 1 carat rough diamond along grains	Time taken to cut a 1 carat rough diamond across grains
Laser Machine	Rs. 30 lakh to Rs. 40 lakh	45 min to 1 hour	3 to 3.5 hours
Blade Sawing machine	Rs. 7,000 – Rs. 8,000	3 to 4 hours	10 to 12 hour

Source: Primary Survey

The weight loss by using laser machines is lesser. Also, the price differential is expected to be lesser going ahead, but laser machines are still expected to be much more expensive than blade sawing machines, and they are thus not expected to completely replace blade sawing machines, especially in the case of smaller players. Cutting is followed by bruiting (ghaat), the process in which two diamonds are set onto spinning axles turning in opposite directions, which are then set to grind against each other to shape each diamond into a round shape. After this, the blocking, faceting and final polishing processes are undertaken – at the end of these three processes, the facets on the diamond are complete (first 8 facets are made, and then expanded to 56 facets depending on the size of the diamond – smaller diamonds will have lesser number of facets). As regards the personnel who work on these aspects of the value chain, it is seen that generally in a CPD manufacturing setup, an employee does same work throughout his career in this industry – i.e. a cutter always remains a cutter. This trend is now changing with the bigger players expecting their employees to be multi-skilled and to work across functions.

- **Grading:** A diamond's cost is based on the characteristics known as the "4 Cs", namely, Clarity, Colour, Cut and Carat. Grading refers to the determining the ‘level’ of each of these characteristics for a diamond – for example, How colourless is the diamond (Colour

characteristic)? What is the level of inclusions in the diamond (Clarity characteristic)? How good are the proportions and shape of the diamond (Cut characteristic)? How big is the diamond (Carat characteristic)?

- *Colour:* Colour quality is critical because the more colourless the diamond, the greater its rarity and value. The scales for colour are: Colourless (D, E), Near Colourless (F, G), White, Faint Colour (I, J, K, L) and Very Light to Light Colour (M to Z).
- *Clarity:* Clarity refers to whether or not inclusions can be seen within a diamond. The common scale used is based on 10-power magnification. The purer a diamond, the greater its value. The scales for clarity are: Flawless / Internally Flawless (FL / IF), Very Very Small Inclusions (VVS1 / VVS2), Very Small Inclusions (VS1 / VS2), Small Inclusions (SI1 / SI2), Internal characteristics / inclusions which are prominent (I1), Internal characteristics / inclusions which are very prominent (I2) and Internal characteristics / inclusions which are extremely prominent (I3).
- *Cut:* Cut refers to the shape of the diamond and the proportions of the stone. When a stone is well cut, light is reflected from facet to facet, then dispersed through the top. The better the cut, the greater the sparkle. Diamond cut is typically graded as: Ideal, Excellent, Very Good, Good, Fair and Poor.
- *Carat:* A “carat” is the gemologist’s standard measure of a diamond’s weight. It is important to note that size alone is meaningless unless cut, clarity and colour are considered. A large stone holds little value if it lacks brilliance, purity and high-grade colour. At the same time, given that large stones are rarer than small ones, size increases the value of a good quality diamond.

Other parameters that are used in grading are fluorescence (determined by UV light testing), lustre, etc. A critical component in determining the price is thus appropriate grading of the diamond. The graded parameters are noted down for each diamond. Grading may be done at the individual factories or when the diamonds are sent to Mumbai for trading. It is important to note that though there are standards available in diamond grading, subjectivity cannot be completely eliminated in the process of grading.

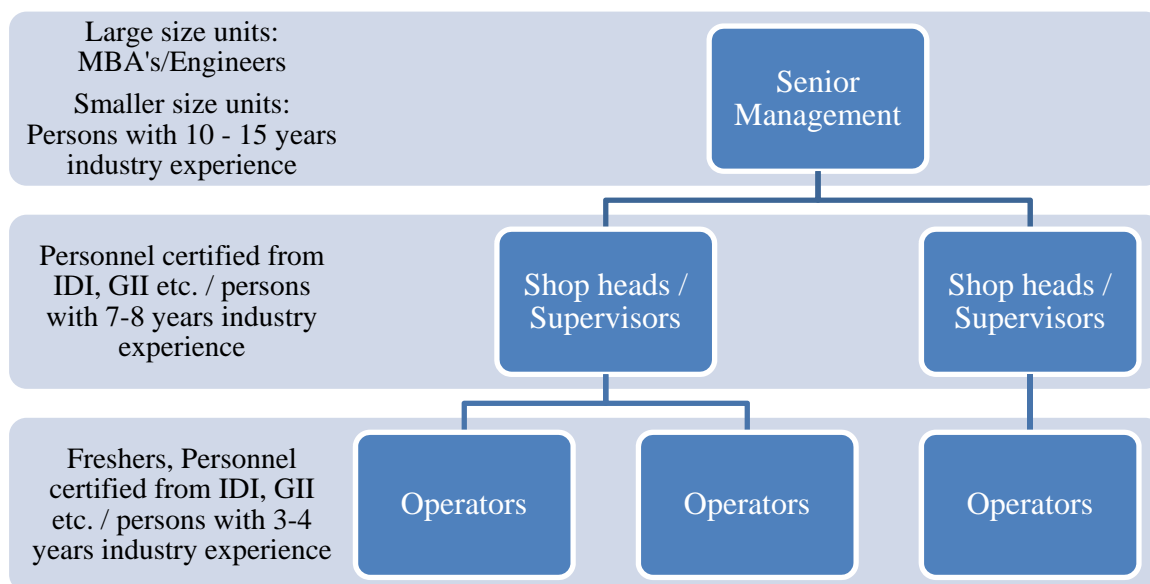
- *Trading:* Trading refers to the process by which cut and polished diamonds are sold. The price of a finished diamonds is determined by using the ‘Rapaport Diamond Pricing System’ which again takes into consideration the 4C’s covered under grading. The Rapaport diamond price list separates the different sizes, colours and clarities of diamonds and arranges these

factors into price categories; the problem arising in using the Rapaport list is the subjective nature of the diamond grading system. Players export finished diamonds directly from their factories (say, in Surat) or, as is typically the case, send them to Mumbai from where they are in turn exported. All players in the CPD segment do not export directly / do not have offices in Mumbai through which the CPD's are exported - players who operate in markets like the Mini Bazaar market or the Mahidharpura market in Surat, sell the CPD's made by them to bigger players who in turn export the products.

2.2.2. Profile of people employed

The following figure illustrates the profile of people employed in the CPD segment.

Figure 20: Profile of people employed in the CPD segment¹⁰



2.2.3. Skill requirements and skill gaps in the CPD segment

The following table presents the skill requirements and gaps across various functions and hierarchical/reporting 'levels' in the CPD segment.

Table 6: Skill requirements and skill gaps in the CPD segment¹¹

Function	Level	Skills required	Skill gaps
Procurement	Across levels	<ul style="list-style-type: none"> ▪ Ability to foresee the yield from a rough diamond and procure rough diamonds that are expected to give the 	<ul style="list-style-type: none"> ▪ Ability to speak fluent English – personnel employed in this function

¹⁰ GII – Gemological Institute of India; IDI – Indian Diamond Institute

¹¹ This is elaborated on at different levels for employment intensive functions like cutting and polishing

Function	Level	Skills required	Skill gaps
		<p>maximum yield</p> <ul style="list-style-type: none"> ▪ Ability to decide the lot size and type of rough diamond to be procured based on the market dynamics ▪ Ability to distinguish pure diamonds from synthetic diamonds ▪ Ability to identify the right price of a rough diamond ▪ Ability to negotiate and get the best price for a rough diamond lot ▪ Ability to identify and price coloured diamonds – e.g. pink / blue diamonds which are rare ▪ Ability to keep a track of the changing trend/consumer preference – e.g., there may be a move towards larger size diamonds, coloured diamonds etc. ▪ Ability to track the market in terms of what is selling plus what is being done by competitors 	<p>are able to convey the point but take significantly more time for doing so because of the language barrier</p> <ul style="list-style-type: none"> ▪ Ability to speak multiple languages – for example, the knowledge of Flemish significantly helps when procuring rough diamonds from Antwerp
Assortment and Planning	Across levels	<ul style="list-style-type: none"> ▪ Ability to study a rough diamond and understand its characteristics so as to group similar rough diamonds together ▪ Ability to understand internal structure of a diamond and accordingly plan the cut along grains and not across grains to the extent possible ▪ Understanding of basic geometry – angles, planes, etc. so as to be able to categorize and plan rough diamonds appropriately ▪ Ability to minimise wastage and maximise yield (in terms of value) from a rough diamond – i.e. the ability to take weight based / purity based 	<ul style="list-style-type: none"> ▪ Insufficient computer knowledge, especially among planners in unorganised sector ▪ Fear / hesitation to adopt new practices or learn new tools like computers – this can be attributed to the reason that a person working in this industry continues to perform almost similar activity throughout his career in the industry ▪ Lack of basic knowledge

Function	Level	Skills required	Skill gaps
		<p>planning decisions</p> <ul style="list-style-type: none"> ▪ Ability to plan the cut so as to avoid inclusions (impurities) in the final CPD ▪ Ability to decide best type of cut – round, marquis, prince, chowki etc. ▪ Basic computer knowledge (for e.g. what is hardware, software, how to open files, etc) for being able to use planning machines ▪ Ability to use computers (for e.g. mouse, CAD software, etc.) – this skill is required for being able to use planning machines ▪ Basic knowledge of science and maths (for e.g. the concept of ‘parallel planes’) ▪ Ability to adapt to new technologies as they emerge – this is critical for small size manufacturing units now moving towards the usage of planning machines 	<p>of science and maths as most persons have limited education and acquire skills in the traditional manner of learning by doing or by familial means.</p>
Cutting and Polishing	Supervisor	<ul style="list-style-type: none"> ▪ Ability to clearly understand concepts such as geometry of diamonds, internal diamond structures (graining, etc.), technology being used, maintenance aspects of tools and machines, etc. ▪ Ability to guide operators and provide direction in case of queries (eg. what to do in the case of a machine breakdown, etc.) from operators ▪ Ability to understand, follow and guide operators as regards the company’s policies and methods of working (eg. some companies may employ separate people for the different faceting / 	<ul style="list-style-type: none"> ▪ Personnel generally move up the ladder in the CPD segment – an operator with 7-8 years of experience is generally a supervisor, and he/she still does not understand the concept behind technologies used

Function	Level	Skills required	Skill gaps
		<p>polishing activities, while some companies may employ multi-skilled personnel for faceting / polishing a complete diamond)</p> <ul style="list-style-type: none"> ▪ Ability to manage operators ▪ Ability to take on-the-spot decisions – e.g. in the case of machine breakdown 	
	Operator	<ul style="list-style-type: none"> ▪ Basic understanding of technology and how it works (e.g. how a laser machine works), i.e. the need to understand the machinery being used ▪ Understanding of the internal structure of a diamond and the concept of why diamond powder is used for cutting and polishing ▪ Understanding of shop floor safety practices – for example, the ability to understand that grinding wheels for the faceting / polishing operation are heavy and should not be lifted manually ▪ Ability to adapt to technology driven processes – e.g. adaptability to work on auto polishing machines that are expected to come to India soon ▪ Ability to take readings from machines (e.g. from pressure sensors on blade sawing machines), interpret them and take appropriate actions without interventions from seniors ▪ Ability to understand internal structure of a diamond and accordingly cut along grains ▪ Presence of mind in working with laser machines / blade sawing machines ▪ Stable hand to be able to accurately 	<ul style="list-style-type: none"> ▪ Operators learn ‘on the job’, but do not understand the technique/rationale behind the same ▪ Un-trained personnel mainly work in these functions currently and thus there is a lack of formal training ▪ Ability to operate advanced machines, like laser machines – when advanced technology replaces manual work in the CPD segment, personnel working in these functions may move to manufacturing units that do not employ the advanced technology

Function	Level	Skills required	Skill gaps
		<p>hold and polish a diamond</p> <ul style="list-style-type: none"> ▪ Ability to understand technical drawings received from planners ▪ Ability to convert technical drawings to actual physical specifications of the diamond ▪ Ability to bring in more symmetry to get more scintillation ▪ Regular preventive maintenance of machines and basic breakdown maintenance ▪ Regular maintenance of tools 	
Grading	Across levels	<ul style="list-style-type: none"> ▪ Ability to use a microscope to carry out detailed observations on diamonds ▪ Technical understanding of the 4C's (i.e. Cut, Clarity, Colour and Carat) and other aspects such as fluorescence, lustre, etc. ▪ Good visual abilities to be able to compare the CPD with masters (say, to compare the colour of the diamond) ▪ Ability to distinguish natural diamonds from synthetic ones ▪ Ability to understand Gemological Institute of America (GIA) charts 	<ul style="list-style-type: none"> ▪ Training courses available are expensive, and hence finding trained people is a challenge. This needs to be understood from the context that a large proportion of the workers are from those with a low education/income. ▪ Training institutes in India are unable to maintain a large store of diamonds given the high value of the same – thus students from such institutes do not have hands-on experience of all aspects of a diamond / all types of diamonds
Trading (domestic / export)	Across levels	<ul style="list-style-type: none"> ▪ Ability to feel the pulse of the market and understand what is selling when and why, i.e. the ability to understand 	<ul style="list-style-type: none"> ▪ Communication skills, especially when dealing with customers from

Function	Level	Skills required	Skill gaps
		market dynamics so as to price the diamond appropriately <ul style="list-style-type: none"> ▪ Ability to price the product based on an understanding of the capacity and willingness to pay of a jewellery manufacturer / retailer (for sales to domestic market) ▪ Communication skills – especially in the export market ▪ Negotiation skills ▪ Ability to build rapport with the buyers so as to ensure repeat orders 	other countries <ul style="list-style-type: none"> ▪ Fluency in the English language ▪ Multi-language skills

Source: Primary research and IMAcS analysis

Planning, especially manual planning, is the most complicated activity in the value chain and is considered the activity requiring the highest level of skill – manual planning is now being replaced by CAD planning. The time taken to start working independently for manual planning is anywhere between 1 to 3 years after a 2 to 3 month training; it takes around 6 to 8 months to start working independently for CAD planning. Faceting / polishing is next in this order and the time taken to start working independently for faceting / polishing is anywhere between 8 to 10 months after a 2 to 3 month training. Grading is the next level, and the skill acquisition time is 6 to 8 months. Cutting does not require very high end skills and is at the next level of the skill pyramid.

A large portion of the faceting/polishing and cutting activities would continue to remain person-dependent with and would drive requirements for human resources and skills.

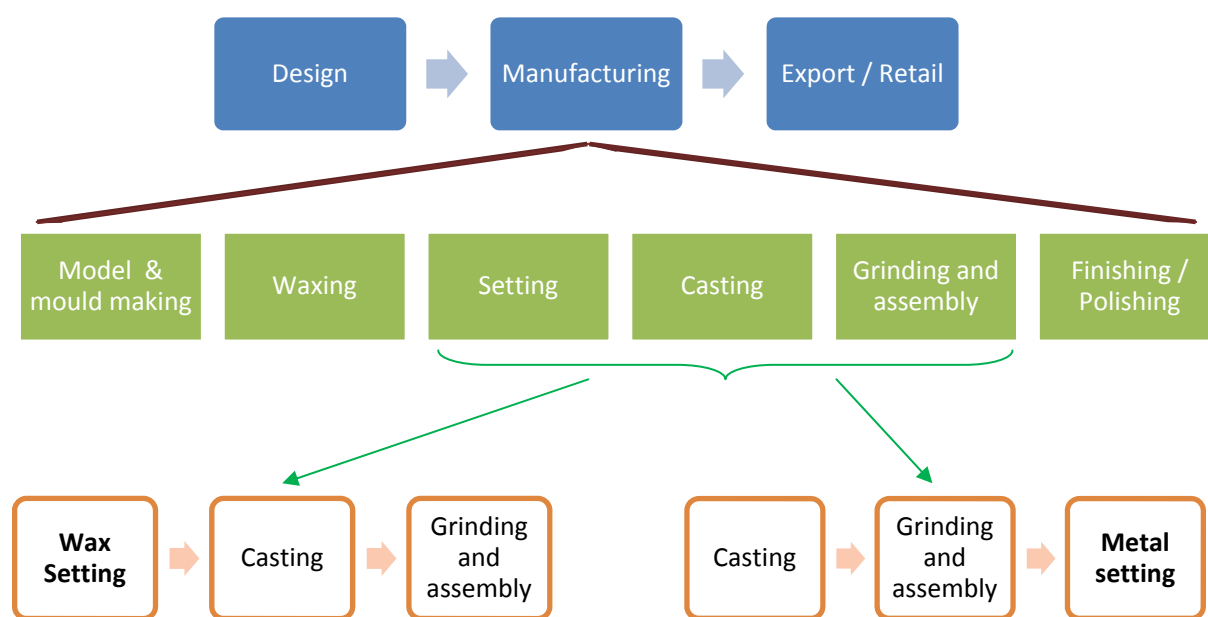
2.3. Skill requirements and skill gaps in the Jewellery Fabrication segment

2.3.1. Value chain of the Jewellery Fabrication segment

In this section, we will reiterate and further detail the value chain in the Jewellery Fabrication segment to set the context for the section on skill requirements and gaps in this segment.

Jewellery fabrication segment much more organized than the CPD segment in India. The value chain within the Jewellery Fabrication segment can be represented as follows:

Figure 21: Value chain within the Jewellery Fabrication segment



The process of setting of stones can be done either in wax or in metal. In units where wax setting is done, the setting operation is done immediately after the waxing process. It is followed by the casting process and then by the grinding & assembly process. In units where metal setting is done, the waxing process is followed by the casting process, then by the grinding and assembly process and then by the metal setting process. The constituents of the value chain are as explained below:

- Design:** In this phase, designs are made either as per an order placed by a customer or based on trends seen in the market. Designs are made on paper or using CAD, which is the trend nowadays. Designs are then validated with the customer, samples are made, re-validated with the customer and the design is finalised. Designs may also be made without an order and thus no validation with the customer is required. When designing jewellery it is very important to be aware of and keep in mind aspects such as the taste / requirements of the wearer / the person placing the order, how the pieces of the jewellery being designed will work / fit

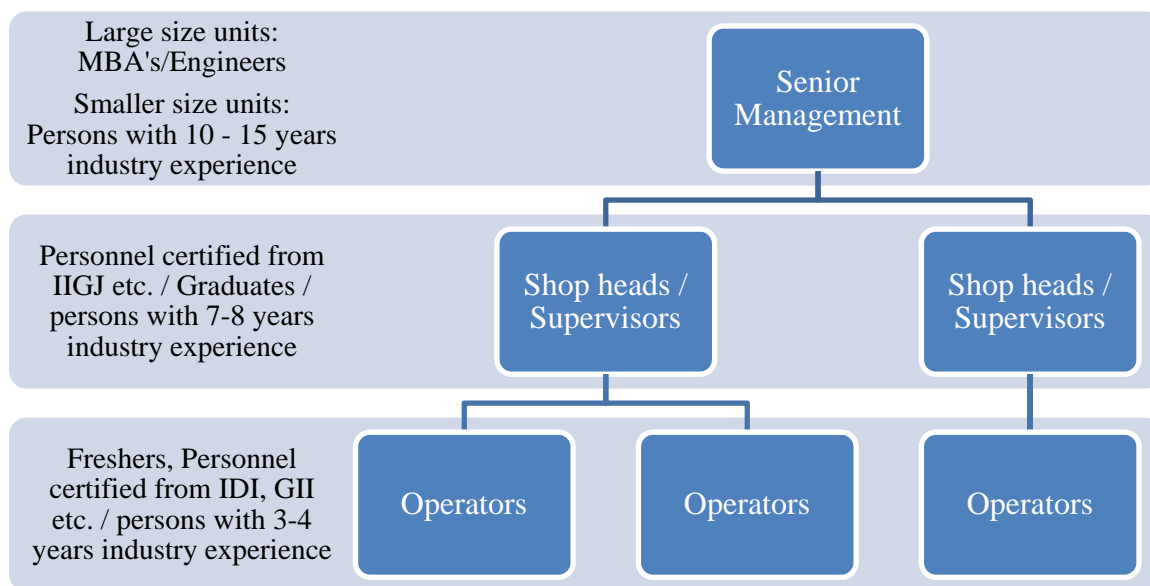
together both in appearance and also physically, the size and type of stones and what sort of design will best compliment them, what metals to use so as to bring out the stone colour more prominently, etc.

- **Manufacturing:** The manufacturing process comprises of a set of 6 activities. Model making refers to making an exact replica of the final product – this will then serve as the master for further process i.e. mould making. A mould is made using the master – moulds have the shape of the piece of jewellery to be manufactured cut into a rubber block. A mould is made for each element of the jewellery piece. Moulds may be made manually, or by using processes such as rapid prototyping/CAM. In the waxing stage, wax is injected into the mould by holding the mould on a waxing machine – wax replicas of the final product are thus made. A wax tree, which is an assembly of wax replicas on a wax sprue is then formed. The wax tree is the input to the casting process, in which, using investment powder, flasks and furnaces gold products take the same shape as the wax replicas on the wax tree. Thus, a corresponding gold tree is formed at the end of the casting process. Individual gold products are then separated, and grinding is done to make individual finished gold pieces (e.g. one of the pieces of a bracelet). These pieces are then assembled by soldering (e.g. to make the complete bracelet). Diamonds or coloured stones are then set in the gold (in cases where wax setting is used, the diamonds / coloured stones are set earlier in the wax itself and then followed by the casting process). Jewellery embedded with stones is then given a final finishing/polishing to obtain the final product.
- **Export / Retail:** Gold jewellery / stone studded jewellery is exported / retained for domestic use. India currently exports a small proportion of gold jewellery, and most of the jewellery produced is consumed in the domestic market. Also, the domestic market primarily consists of plain gold jewellery which accounts for about 80% of the domestic jewellery market. Jewellery manufacturers who only obtain manufactured jewellery from jewellery manufacturers are also present in India. At the same time, jewellery manufacturers also have their individual retail outlets.

2.3.2. Profile of people employed

The following figure illustrates the profile of people employed in the jewellery fabrication segment. The profile is similar to that of persons employed in the CPD segment, but in the case of jewellery fabrication segment more graduates and educated persons are seen.

Figure 22: Profile of people employed in the Jewellery Fabrication segment



2.3.3. Skill requirements and skill gaps in the Jewellery Fabrication segment

The following table presents the skill requirements and gaps across various functions and hierarchical/reporting ‘levels’ in the Jewellery Fabrication segment.

Table 7: Skill requirements and skill gaps in the Jewellery Fabrication segment

Function / Sub-Function	Level	Skills required	Skill gaps
Design	Across levels	<ul style="list-style-type: none"> ▪ Ability to convert customer needs/specifications to product designs, i.e. the ability to adapt the design so as to meet the customer needs ▪ Ability to understand market trends in jewellery – e.g. move towards non-precious materials, use of coloured stones, weight of jewellery preferred by customers etc. ▪ Ability to understand fashion and fashion trends and design jewellery accordingly 	<ul style="list-style-type: none"> ▪ Tendency to produce traditional designs that may not be fully accepted by the international market

Function / Sub-Function		Level	Skills required	Skill gaps
			<ul style="list-style-type: none"> ▪ Creativity, so as to be able to create multiple designs to meet customer needs – for example, the customer may only specify that he/she wishes to have five 5 cent diamonds set in 18 carat gold. The designer should be able to show the customer different design options with the same physical configuration ▪ Ability to interact and work with foreign clients ▪ Ability to respond to customer queries 	
Manufacturing	Model and mould making	Across levels	<ul style="list-style-type: none"> ▪ Understanding of engineering concepts such as tolerances, etc. ▪ Ability to provide the correct amount of clearances while making the mould such that the final product is exactly as per the specifications ▪ Ability to use mould making machines ▪ Understanding of metallurgy and properties such as the melting point of gold 	<ul style="list-style-type: none"> ▪ Minimal formal training in place and thus learning is typically by the seeing-and-doing way
	Waxing and Casting	Across levels	<ul style="list-style-type: none"> ▪ Ability to correctly align the mould in waxing machines ▪ Ability to oversee application of correct pressure in waxing machines ▪ Ability to set the correct technical parameters in casting 	<ul style="list-style-type: none"> ▪ Inadequate understanding of safety measures and requirements ▪ Lack of adequate ability to understand the metallurgical

Function / Sub-Function		Level	Skills required	Skill gaps
			<p>machines</p> <ul style="list-style-type: none"> ▪ Understanding of safety requirements ▪ Understanding of the properties of different caratages of gold ▪ Understanding of casting technology ▪ Understanding of metallurgy and properties such as the melting point of gold, cycles for gold melting, etc. 	<p>properties of gold and the corresponding differences between different types of gold</p>
	Setting (wax / metal)	Across levels	<ul style="list-style-type: none"> ▪ Ability to identify the degree of internal stresses and accordingly apply the correct pressure to the diamond/coloured stone while setting (should not be too tight/too loose) ▪ Ability to do all kinds of setting – i.e. prong setting, pave setting, bezel setting and invisible setting ▪ Ability to perform delicate work, especially for intricate jewellery designs ▪ Hand – eye coordination so as to set the stone at the exact location in the gold, without any error ▪ Good visualisation ability 	<ul style="list-style-type: none"> ▪ Minimal formal training in place and thus learning is typically by the seeing-and-doing way
	Grinding and Assembly	Across levels	<ul style="list-style-type: none"> ▪ Ability to understand the concept of linkages ▪ Ability to understand the principles of precision 	<ul style="list-style-type: none"> ▪ Knowledge of the soldering process and the science behind it ▪ Knowledge of using

Function / Sub-Function		Level	Skills required	Skill gaps
			manufacturing <ul style="list-style-type: none"> ▪ Ability to apply the correct pressure while soldering 	solder of the same caratage as the gold pieces being soldered
	Finishing / Polishing	Across levels	<ul style="list-style-type: none"> ▪ Ability to understand the use of cloth buffs and synthetic wire brushes ▪ Ability to understand cutting compounds and polishing compounds for rough polish and fine polish respectively ▪ Ability to use the right amount of cutting/polishing compounds ▪ Ability to use select and use different brushes for finishing/polishing requirements ▪ Ability to apply the correct pressure while finishing / polishing ▪ Ability to understand the electroplating process 	<ul style="list-style-type: none"> ▪ Lack of adequate understanding of the plating process ▪ Lack of adequate understanding of the reason behind using specific compounds/brushes for specific products
	Across functions	Helper	<ul style="list-style-type: none"> ▪ Distribute water ▪ Clean the premises ▪ Dusting ▪ “Ghaat ka kaam” – like, making wires, strips, wire bending, etc. 	<ul style="list-style-type: none"> ▪ These are generally untrained, uneducated and inexperienced people ▪ While no technical skills are required, they need basic workplace skills
Export / Retail		Manager	<ul style="list-style-type: none"> ▪ Ability to understand the product – i.e. how many grams of gold is used, how many diamonds of what caratage are used, etc. Ability to understand 	<ul style="list-style-type: none"> ▪ Given the corporatised/organised jewellery retail formats emerging, the ability

Function / Sub-Function	Level	Skills required	Skill gaps
		<p>trends in jewellery retail</p> <ul style="list-style-type: none"> ▪ People management ▪ Customer management and customer interfacing skills ▪ Time management ▪ Process management ▪ Communication skills and selling skills ▪ Supply chain and inventory management 	<p>to work in such an environment may be an issue for personnel who have worked mainly in family-run setups</p> <ul style="list-style-type: none"> ▪ Ability to understand and adapt to retailer-specific requirements/culture
	<p>Front line sales executives</p>	<ul style="list-style-type: none"> ▪ Ability to push customers to purchase higher priced jewellery by influencing the 'buyer influencing the decision' ▪ Ability to converse in a polite manner patiently with the customer in local language, and gauge buying sentiments/occasions, especially auspicious occasions ▪ Ability to present oneself in a manner acceptable to the customer (appearance, dress, etc.) ▪ Ability to understand the price budget of the customer and offer the best available designs in the showroom ▪ Ability to answer customer queries on price prevailing on the give day (as gold prices fluctuate) ▪ Soft skills such as 	<ul style="list-style-type: none"> ▪ Ability to quickly understand customer needs on designs and prices and show pertinent available designs ▪ High product knowledge to influence buying behaviour ▪ Given the corporatised/organised jewellery retail formats emerging, the ability to work in such an environment may be an issue for personnel who have worked mainly in family-run setups.

Function / Sub-Function	Level	Skills required	Skill gaps
		communication and patience (as people tend to take long time in choosing jewellery) ▪ Ability to understand customer requirements and preferences and show products to meet their expectations ▪ Opening/closing of sales	

Source: Primary research and IMAcS analysis

Setting, especially metal setting, is considered the activity requiring the significant skill. The time taken to start working independently for the operation of setting is anywhere between 8 to 10 months¹². The activities of model making, design and retail can be considered at the next level in the skill pyramid and the time taken to start working independently is typically 6 to 8 months. The activities of grinding and assembly/finishing and polishing can be considered at the next in order of decreasing complexity, and the time taken to start working independently for these is typically 2 to 3 months. Waxing does not require very high end skills and is much lower in terms of complexity. Casting is mainly carried out by machines with manual intervention limited to loading, unloading, etc.

2.4. Emerging trends in skill requirements

Some of the emerging trends in human resource and skill requirements in the gems and jewellery industry in India are as below¹³:

Emerging trends in human resource requirements

- **Use of Technology:** In the Gems and Jewellery industry in India, technology is not expected to completely take over manual work and no major shift from manual to automated is expected; at the same time, the increased use of technology is expected to reduce the need for certain types of personnel engaged in this industry. The following examples exemplify the same:
 - A typical example is the case of model makers - with the advent of CAM model making or model making by rapid prototyping, the need for model makers is expected to drastically reduce in the future – companies are already finding model makers to be redundant.

¹² Wax setting requires lower skills, is faster and more secure. It can be used of smaller diamonds, ruby and sapphire. It is difficult to use for larger diamonds and other colored gemstones.

¹³ Documented based on inputs received as part of Primary Research

- Similarly, the advent of planning machines and software has reduced the need for manual planners.
- It is also expected that the use of auto faceting / polishing machines for CPD's (mainly from Israel) will pick up in the industry (approx. 10-15% of the manufacturing units are expected to possess these machines in the next 10 to 12 years¹⁴). At the same time, the industry expects that only about 75-80% of the faceting / polishing will be done on these machines in the next 10 to 12 years since the technology is not yet proven and these machines will be very expensive - the final faceting / polishing will then need to be done manually and faceters / polishers will still be needed. Also, the price of these machines, which will need to be imported from countries like Israel, is expected to be prohibitive especially in the next 5 to 6 years, thus making it unaffordable for smaller sized CPD units to procure these.
- Machines are now available for the grinding / assembly process in jewellery manufacturing – since these machines are able to assemble standard / non-complex products such as bracelets, these may replace personnel employed for such products. At the same time, such machines are not expected to replace manual work for complex products such as necklaces.
- The use of machines for blocking in CPD manufacturing is expected to reduce the need for manual intervention by more than 80% - human intervention will be required mainly in cases of rough diamonds which have a hole / inclusions within.
- The use of machines for bruiting has already reduced the need for human intervention – one person is able to do the job for which earlier almost 20 persons were required¹⁵.
- Machines for stone setting in jewellery fabrication may be used for standard shapes of stones (eg. round) or machines may be configured for volume-intensive shapes. At the same time, though such machines may be used, the nature of the industry is such that designs change frequently – thus, though the usage of these machines may increase till 2022, they will not replace manual labour.
- Polishing machines for jewellery fabrication currently are not sophisticated enough – for example, they are currently unable to polish the corners in a jewellery design and may be able to accomplish only 20-30% of the final polishing beyond which manual intervention is required. It is expected that the extent of polishing that will be accomplished by these machines will increase with technological advances, but the proportion of such machines used in India will be low.

¹⁴ Documented based on inputs received as part of Primary Research

¹⁵ Industry inputs

- **Participation of women in the workforce:** The Gems and Jewellery industry in India currently employs a small percentage of women. At an industry level, the male to female proportion is about 4 to 1¹⁶. Also, the participation of women in the workforce is mainly on the jewellery fabrication side (functions such as jewellery design, wax setting, polishing, bagging, QC, etc) and it is very low in the CPD segment. This proportion is expected to change going ahead as the jewellery fabrication segment grows further and the CPD segment declines.
- **Need for additional personnel in the jewellery fabrication segment:** A jewellery park is coming up at Icchapur (near Surat) and this park is expected to provide employment to about 3 to 4 lakh persons and start operations in the next 2 to 3 years. Though it is expected that some persons from West Bengal may be hired to work in this jewellery park given their traditional skills background, it is expected that it may be difficult to get trained workforce to work in this jewellery park.
- **More educated people in the industry:** As seen in Table 4, the proportion of people working in this industry and who have studied till below 10th standard is high – it is around 70-75% for the CPD segment and around 40-45% for the jewellery manufacturing segment. Given the overall rise in literacy levels in India, this situation is changing. Given the rising overall literacy rates in India, persons educated only till 10th standard and below are expected to account for only about 10 – 15 % of the workforce by 2022¹⁷. Employees with additional educational qualifications are also found more open to new ideas and the ability to explore options other than the standard way of doing things. The change is also driven by founders of units appreciating the need for education and its impact on their business – it is observed that the 3rd / 4th generations of founders are much more educated than the founders themselves¹⁸.
- **Hiring by references / poaching:** Small and medium size factories, i.e. factories that employ less than 1000 persons and account for over 95% of the number of manufacturing units¹⁹ are expected to continue to hire people by references or by poaching from other units – persons trained through institutes like IDI, IIGJ, GII etc, will typically work with large sized players.
- **Move towards the processing of larger sized diamonds requiring lesser people:** As covered earlier, India has traditionally been procuring and processing small size diamonds, though this

¹⁶ Based on inputs received in the Primary Research

¹⁷ Based on inputs received in the Primary Research

¹⁸ Based on inputs received in the Primary Research

¹⁹ In terms of number of units

trend is now changing and large size factories have started procuring larger size diamonds. Also, currently the salaries for workmen in this industry are not fixed – the salary earned depends on the type of work done by the workmen (eg. ghaat / taliya / table / aath pail / mathala) the size of the diamond worked on, etc. Also, most of the people employed in the CPD segment are employed on a “per-piece” basis. For example, persons working on ghaat and taliya may earn up to three times that earned by persons working on table, aath pail and mathala, for the same size of diamond. At the same time, the time required to work on ghaat or taliya is about double that required to work on table, aath pail and mathala. With the move towards larger sized diamonds, it is expected that factories, especially the bigger factories, may need lesser people, since larger sized diamonds need lesser number of people to work²⁰.

- **Recent attrition of human resource:** India is the largest manufacturer of cut and polished diamonds in the World. It is estimated that 11 out of 12 finished diamonds are from India. The recession in the second half of 2008 has severely affected the gems and jewellery industry in India not only in terms reduced sales but also in terms of employment. For example, in the Surat cluster for CPD’s, due to reduced demand, lack of work, and loss of faith in the industry picking up momentum, approximately 1 lakh people who have moved to alternate jobs in search of livelihood have not returned. With the market picking up again since the last few months, the industry is finding it difficult to get these people back on board, thus creating a shortage of skilled workers for the cluster. Though this is currently a concern, the situation is expected to be back to normal within a year.

- **Other trends:** Some other trends include:
 - It is seen that freelancers are working in the design function and employers do not employ all their designers on-rolls.
 - A small proportion of diamond sorters are also being employed on contractual basis.
 - Currently a very small proportion (about 5%) of workmen in the CPD segment are registered – this trend is expected to change, though very marginally, with an increased level of organization in this segment.
 - It is perceived that there may be a requirement for some new personnel like health and safety officers in the manufacturing units – currently only large units employ such personnel. It needs to be noted that the above mentioned posts are not large in number.

²⁰ Based on inputs received in the Primary Research, it is seen that for the same turnover of a large sized and a small sized factory, the factory processing larger size diamonds may need to employ 15 to 20 times lesser workforce than that employed in a factory processing small size diamonds.

- The level of corporatization in this industry is expected to increase, especially in the jewellery fabrication segment

Emerging areas of skill requirements

- ***Multiskilling:*** In the current scenario, skills in the Gems and Jewellery industry in India are limited to the particular function being performed by the workmen – for example, cutters generally remain cutters throughout their career in this industry. Multi-skilling is a trend that is now being seen – more and more large sized companies expect their workmen to be able to work on all aspects of the trade. Larger sized manufacturing units have already started moving away from this traditional setup, and personnel working in these units work across all the processes in the overall manufacturing process.
- ***Need to address issues in current training:*** There are certain issues associated with the training institutes that are currently in place. Some are as highlighted below:
 - Training institutes currently offer courses which are typically expensive (for example, the cost of a diamond diploma course which is for around 3.5 months is about Rs. 55,000, while the cost of short term courses for 2 weeks to 1 month range from Rs. 25,000 to Rs. 35,000. Hence, personnel working at the workmen level who come from the lower strata of society, are unable to afford these courses, and personnel getting certified from these institutes mainly work at the middle management level.
 - The yearly out-turn of trained personnel from these institutes is low. For example, only about 25 to 30 persons ready for the CPD segment pass out of a particular institute each year.
 - Companies that nominate their personnel for these courses are generally large sized companies; the training needs for personnel working in small sized companies thus go unaddressed.
 - Criteria for admission for international training institutes include a 10 + 2 qualification plus the knowledge of the English language, since the course curriculum is taught in English. Most personnel working at the workmen level are minimally educated and do not understand English – thus, they will not qualify for these courses and will be unable to attend such programs.

In all, even though there are training institutes, there exists scope to broaden the scale and scope of training – in terms of skill sets and number of persons trained. Additional institutes

are expected to come up, but the extent to which the above parameters will be addressed remains to be seen. This will be critical in bridging skill gaps going ahead.

- ***Move to coloured gemstones / plain gold jewellery / non-precious jewellery:*** The Gems and Jewellery industry in India has achieved saturation in terms of the work done in the cut and polished diamonds segment – margins are reducing and there is increased competition from countries such as China. The availability of rough diamonds is also expected to be a concern going ahead²¹ (due to limited availability in mines). It is thus expected that coloured gemstones / plain gold jewellery will pick up further, leading to a corresponding need for persons to work in these areas and thus the corresponding skills. The industry also expects a trend towards the non-precious – for example, silver jewellery, cubic zirconia stones (American diamond), gold plated jewellery, etc. Persons with the requisite skills will be required for working on such products.
- ***Need for training for jewellery fabrication segment:*** Given the saturation in the CPD segment and the emphasis on the jewellery fabrication segment, the industry view is that trained personnel in the jewellery fabrication segment will be required and emphasis on training personnel for this field is critical. The current capacity of training institutes to supply trained personnel for the jewellery fabrication segment is limited.

Among the training and skill building focus areas required, the thrust has to be on the jewellery fabrication/setting space.

2.5. Projected industry size and human resource requirements

2.5.1. Projected Industry Size²²

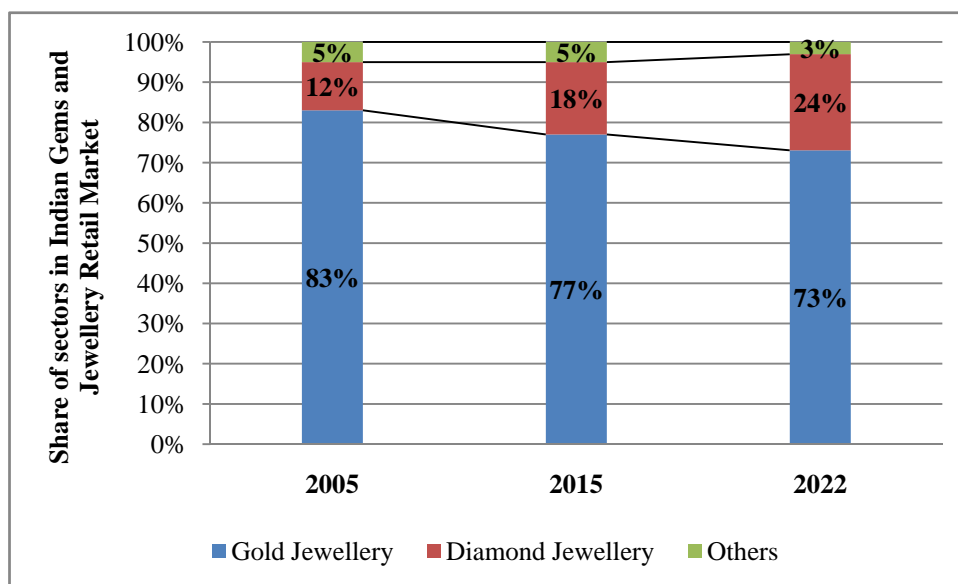
The Gems and Jewellery sector is expected to witness certain structural changes which will drive human resource requirements.

- Growth in purchase of jewellery driven by increasing consumption, with consumption of luxury items expected to grow at 8.5% to 9% in the long term.
- A trend towards increasing preference for more fashionable jewellery and diamond jewellery.
- Setting and fabrication of jewellery heralding the next phase of growth given that the processing of cut and polished diamonds is nearing saturation.

²¹ Industry inputs

²² Our overall approach to macro-economic modeling and forecasting is explained in a separate annexure

Figure 23: Increasing share of diamond jewellery in the retail market

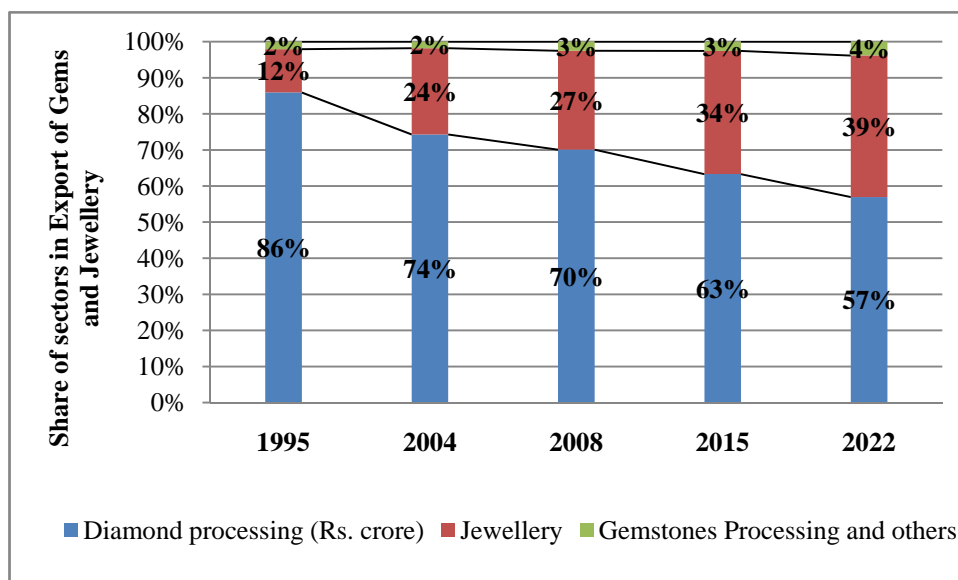


Source: GJEPC and IMAcS analysis

The share of diamond jewellery is expected to increase to 24% by 2022 from the current levels of about 15%.

On the export front, the share of fabricated jewellery is expected to increase from about 27% currently to about 40% by 2022.

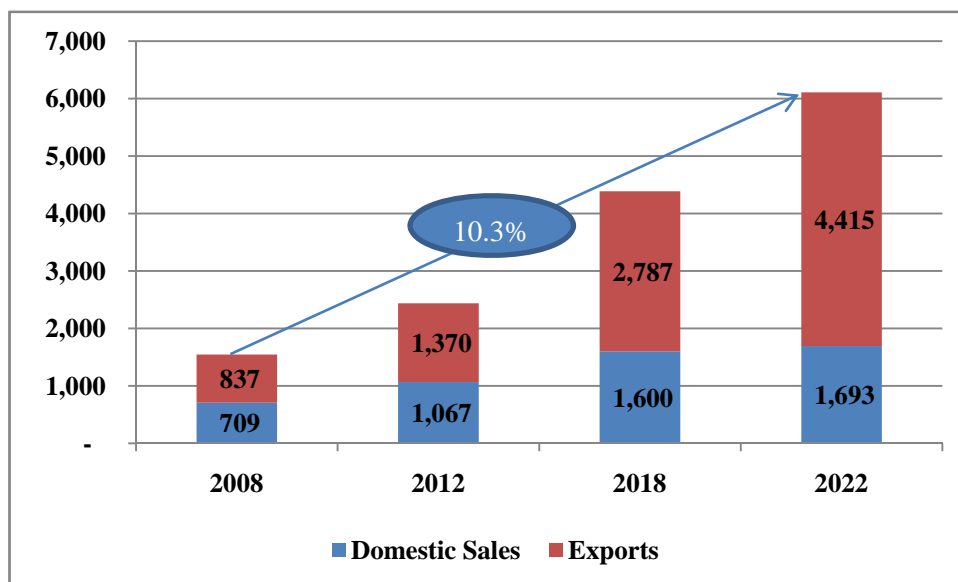
Figure 24: Share of exports of different segments in Gems and Jewellery Industry



Source: GJEPC and IMAcS analysis

Given, the trends detailed above, it is expected that the Gems and Jewellery industry would enjoy a growth of about 8.5% in the period upto 2015, and about 7% in the horizon till 2022 thereby recording revenues of Rs. 1,700 billion. The export segment is expected to witness a growth of about 12.5% till 2022 and reach a size of Rs. 4,400 billion.

Figure 25: Gems and Jewellery Industry in India – Size in Rs. crore



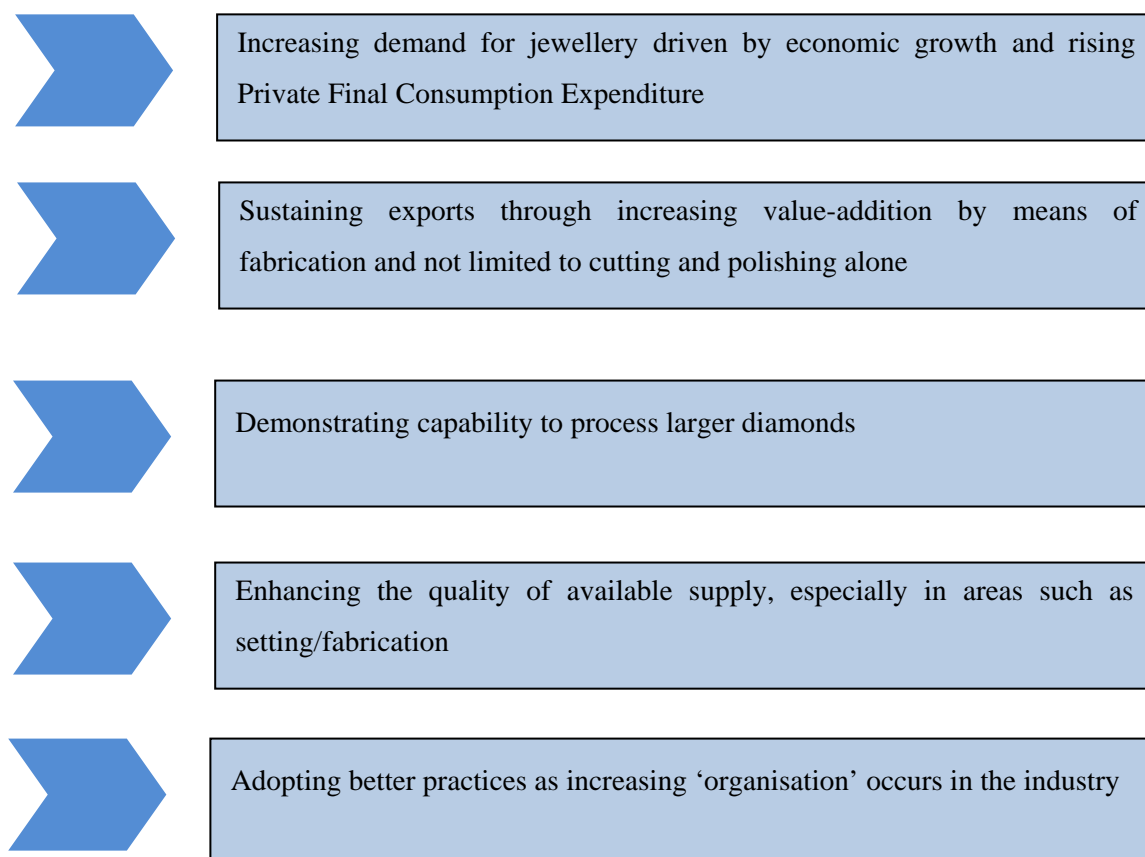
Source: IMAcS analysis

In all, the Gems and Jewellery industry (domestic sales and exports) would grow at 10.3% on a CAGR basis till 2022.

2.5.2. Projected human resource required in the Gems and Jewellery industry

Our estimation of human resource requirement for the Gems and Jewellery industry is driven by the following factors as shown in the figure below.

Figure 26: Dimensions influencing growth and human resource requirements of Gems and Jewellery industry



Keeping in mind the above dimensions and need for skills therein, it is expected that the Gems and Jewellery industry would have the potential to employ about 8 million persons by 2022. This would mean an incremental human resource requirement of about 4.6 million persons between 2008 and 2022.

Table 8: Projected human resource requirements for the Gems and Jewellery Industry in India till 2022 (in '000s)

	2008	2012	2018	2022	Incremental
Jewellery Fabrication	1,167	1,626	2,339	2,707	1,540
CPD	767	1,032	1,563	2,031	1,264
Gemstones and other categories	267	432	858	1,415	1,148
Jewellery Retail	1,134	1,517	1,905	1,791	657
Total	3,335	4,608	6,665	7,943	4,609

Source: IMACS analysis

In these segments, Jewellery would largely cater to the Indian market with an increasing export component.

Based on the profile of human resource employed, the following table presents the incremental demand for persons across various educational levels in the Gems and Jewellery industry.

Table 9: Human resource requirement across various education levels till 2022 (in '000s)

	Research/ Design	Engineers	Diploma	ITI and other vocationally trained	Other graduates	CA/ MBA/ etc.	12th/10th standard and below/dropouts
Jewellery Fabrication	31	15	31	31	123	123	1,186
CPD	13	13	25	25	25	101	1,062
Gemstones and other categories	11	11	23	23	92	92	896
Jewellery Retail	20	-	7	-	164	99	368
Total	75	40	86	79	405	415	3,511
Incremental human resource requirement				4,609			

Source: IMACS analysis

The human resource requirement across various functions is presented below.

Table 10: Human resource requirement across various functions (in '000s)

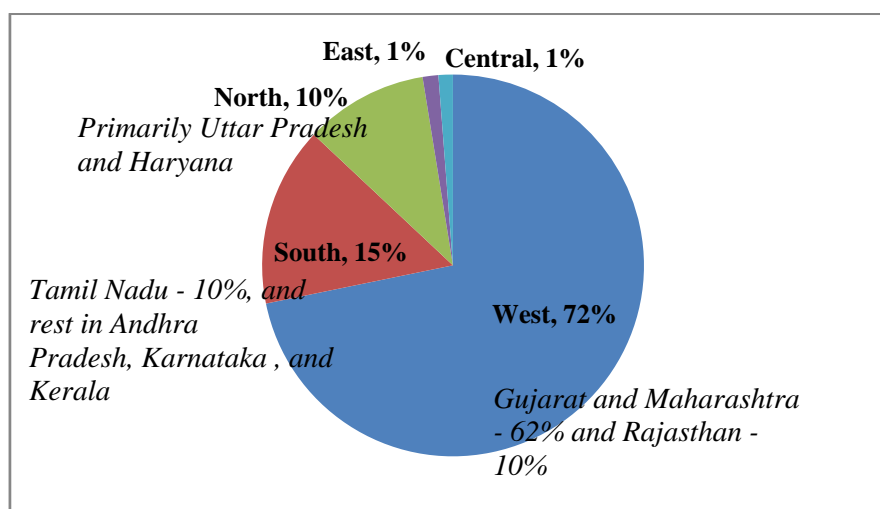
	Design	Planning	Procurement	Manufacturing	Sales	Admin, Management, Support
Jewellery Fabrication	31	-	31	1,317	77	85
CPD	13	-	13	1,118	63	57
Gemstones and other categories	11	-	11	1,016	57	52
Jewellery Retail	20	7	13	-	558	59
Total	75	7	68	3,451	756	252
Incremental human resource requirement				4,609		

Source: IMACS analysis

2.5.3. States and regions driving human resource requirement in the manufacturing space (fabrication and processing)

The Western Region, comprising of Gujarat and Maharashtra would account for about 60% of the human resource requirement in the manufacturing space and thereby drive the need for skill building. Rajasthan would account for about 10% of the human resource requirement. The Southern Region would be the next major region as indicated in the figure below.

Figure 27: Major regions driving human resource requirements in the Gems and Jewellery sector



Source: Annual Survey of Industries and IMaCS analysis

2.5.4. Skills of specific interest to the Gems and Jewellery industry

Some of the skill sets which are of specific interest to the Gems and Jewellery industry comprise of jewellery fabrication skills (also referred to as ‘setting’, and related activities). In the CPD segment, grading and cutting skills will be in demand in the long term. Accordingly, the following table presents the human resource requirements in these skill sets.

Table 11: Human resource requirements in specific skills till 2022 (in ‘000s)

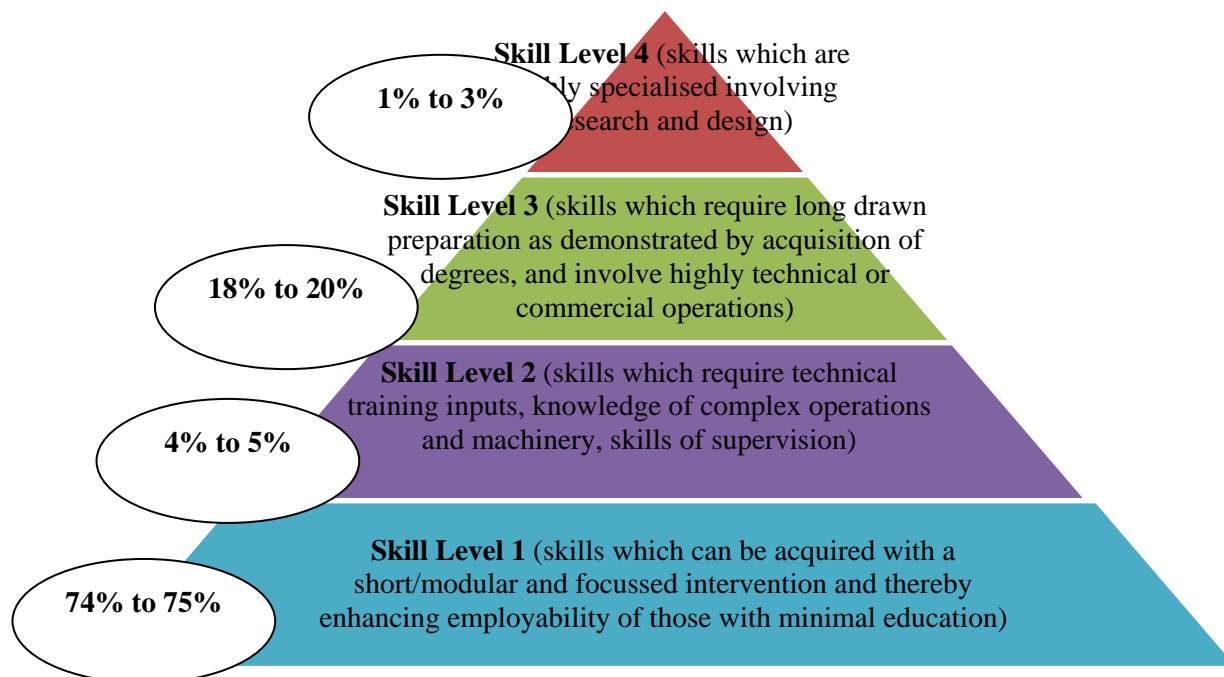
	2008	2012	2018	2022	Incremental
Jewellery Fabrication					
Jewellery Fabrication Skills	992	1,382	1,988	2,301	1,309
CPD					
Graders	100	134	203	264	164
Faceting, polishing, cutting skills	562	756	1,144	1,487	925

Source: IMaCS analysis

2.5.5. Skill Pyramid

Given that the industry would require a varied profile of skill sets, the following figure presents an overview of the profile of skill requirements as derived from human resource requirements across different sectors of the Gems and Jewellery industry.

Figure 28: Skill Pyramid in the Gems and Jewellery Industry



Source: Industry inputs, IMAcS analysis

The skill pyramid, in summary, captures where the Gems and Jewellery industry stands relatively in terms of skills (a function of activity, educational requirements, and amount of ‘preparatory’ time required to inculcate a specific skill) as compared to all other industries.

As can be observed, the lower portion of the pyramid, ‘Skill Level 1’, has the highest incremental requirement of human resources. It requires persons who are minimally educated, yet can handle simple and/or repetitive tasks (persons such as cutters, those engaged in polishing, etc.). Such skills can also be obtained in lesser time duration as compared to engineering or ITI. As many as 4.6 million persons are required across various skill levels outlined above. Out of this, the bottom level itself accounts for over 75% of the skill requirements. The skills of setting, polishing, and faceting are potential areas to channelise skill building initiatives in the Gems and Jewellery industry going forward.

This report has been prepared by **ICRA Management Consulting Services Limited (IMaCS)**.

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