A Review of the Political and Economic Forces Shaping Today's Diamond Industry

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During the past 15 years, political and economic forces have converged to radically transform the structure of the diamond industry worldwide. This article examines how upheavals in the former Soviet Union and several African nations—as well as the arrival of new sources such as Australia and Canada—led to the restructuring of the rough diamond market. This in turn created new competitive pressure at the wholesale and retail levels, including the movement to establish new diamond cuts and diamonds as branded items. At the same time, technological advances have enabled the faster, more efficient manufacturing of rough diamonds, created new treatments, and fostered the introduction of economically viable gem-quality synthetics. While demand for diamond jewelry remains strong in the U.S., which accounts for nearly 50% of world consumption, new markets such as India and China are likely to spearhead continued growth. In addition, new social and governmental initiatives have affected how the entire industry conducts business.

In the Fall 1988 issue of *Gems & Gemology*, William E. Boyajian chronicled the price-supply upheavals in the diamond market of the late 1970s and 1980s that set into motion some of the forces that would bring even more radical changes in subsequent years. These included the speculative and "investment diamond" era of the late 1970s, and the subsequent crash that forced a number of firms into bankruptcy. Japanese consumers led the awakening of Asian consumer markets that helped revive the diamond trade in the mid-'80s. In addition, the large output of small, lower-quality diamonds from Australia's Argyle mine, coupled with the exponential expansion of India's diamond manufacturing industry, made diamond jewelry a mass-market item for the American middle class.

This article looks at the many developments that have had an impact on the world diamond industry since the 1980s. Momentous changes in world politics, in particular, have had a profound effect: The end of the Cold War unleashed a competitive spree for Russian rough diamonds; civil wars in some African diamond-producing nations revealed a dark underside of the diamond industry; and the collapse of several Asian economies in the late 1990s delivered a devastating blow to some diamond operations.

In addition, diamond sources in Australia and Canada were developed by mining companies that challenged De Beers's traditional single-channel sales market. A diamond manufacturer, Lev Leviev, also became a major rival to De Beers by securing lucrative diamond sources in Angola, Namibia, and Russia. De Beers recast its own operations at the turn of the millennium and tried, along with industry bankers, to shift the industry from a supply-driven to a demand-driven mentality, pushing its sightholders to greater vertical integration and investment in sales and marketing programs. Meanwhile, diamond-producing nations began asserting greater control over their resources, including demands that a share of their bounty be processed locally. This has profound implications for diamond manufacturers in all parts of the world, as well as for distributors in the middle

See end of article for About the Author and Acknowledgments.
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Figure 1. Though diamonds have always adorned the wealthy and famous, recent decades have seen a notable increase in the popularity of flashy, "bling-bling" styles of diamond jewelry. Here American singer Beyoncé is shown wearing a dramatic pair of diamond mesh earrings by Lorraine Schwartz, New York, while arriving at the 2005 Academy Awards. Photo © Lisa O'Connor/ZUMA/Corbis.

of the pipeline. Technological advances during the 1990s made diamond manufacturing vastly more efficient, created new retail avenues that greatly affected the way diamonds were sold, and yielded new treatments and synthetics that challenged gemologists' skills. Consumers became privy to a vast array of gemological and market information about diamonds, and celebrities made them an even more important element of high fashion (figure 1).

All of these developments are still fluid, and they undoubtedly will continue to bring deep changes to the diamond industry, challenging retailers, dealers, and gemologists to adapt. On the positive side, new, lucrative consumer markets for diamonds have developed and show no sign of slowing, creating immense opportunity amid these challenges.

DIAMOND PRODUCTION AND DISTRIBUTION: THE EVOLUTION OF A MULTI-CHANNEL SELLING MARKET

Some of the most radical changes came in the production and distribution of rough diamonds. In 1991, worldwide production totaled approximately 106 million carats (table 1). The majority of world production was concentrated in southern Africa, with other sources including Australia and the Soviet Union (Levinson et al., 1992). Through its single-channel marketing approach, formally adopted in 1935 ("Diamonds," 1935), De Beers still managed the distribution of the vast majority of rough diamonds entering the world market. Yet within 10 years, changes in De Beers's relationships with Russian and Australian producers, the development of mines in Canada, and political events in Africa would dramatically reduce De Beers's share of the market and greatly alter the entire dynamic of the diamond industry (Even-Zohar, 2002). The map of world diamond production and major cutting centers that Boyajian published in 1988 (p. 149) has undergone some significant changes (figure 2).

De Beers's Central Selling Organisation/Diamond Trading Company. Since 1888, De Beers has been the world's primary supplier of rough diamonds. As recently as 1993, the De Beers Central Selling Organisation (CSO) controlled about 80% by value of the approximately $5.5 billion world market,

through ownership of its own mines in South Africa (see, e.g., figure 3) and 50-50 partnerships in mines with the governments of Botswana and (since 1994) Namibia (Austin, 1994; Shor, 2004). In addition, the CSO marketed all of Russia's rough diamond exports, as well as all official production from Zaire's (Democratic Republic of the Congo [DRC] after 1996) Minière de Bakwanga (MIBA) mine and Angola's state-owned diamond-mining company, Endiama. It also maintained buying offices in most African producing nations and Brazil to buy rough on the open market. With one exception (the Argyle mine), all major diamond production sources were controlled by either De Beers or the governments of the countries in which the mines were located, often in partnership with one another. The 20% of rough traded outside the CSO came from independent shares of Argyle; small mining operations in South Africa, South America, and elsewhere; informal alluvial mining in West Africa; and market "windows"—a percentage of rough diamonds the CSO permitted its contracted producers to sell on the open market to gauge prices.

The CSO mixed rough diamonds from all sources and sorted them by quality, shape, and weight criteria (figure 4). Ten times yearly, it marketed rough to a specific roster of clients at "sights." In times of slack demand or overproduction, the CSO would act as a market buffer by stockpiling diamonds or reducing their purchases from certain producers (effectively forcing them to stock at the mine sites).

Yet several forces were developing that would significantly affect the CSO's ability to maintain a majority share of the rough diamond market, hold stocks of rough to regulate price fluctuations, and fully control rough diamonds it obtained from its

TABLE 1. World rough diamond production by country, 1991–2003 (in thousands of carats).[a]

Country	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Gem and near-gem													
Angola	899	1,100	130	270	2,600	2,250	1,110	2,400	3,360	3,914	4,653	4,520	4,770
Australia	17,978	18,078	18,844	19,485	18,300	18,897	18,100	18,400	13,403	11,956	11,779	15,142	14,900
Botswana	11,550	11,160	10,310	10,550	11,500	12,400	15,100	14,800	17,200	18,500	19,800	21,300	22,800
Canada[b]	—	—	—	—	—	—	—	300	2,429	2,534	3,716	4,984	11,200
Zaire/D. R. Congo	3,000	8,934	2,006	4,000	4,000	3,600	3,000	3,300	4,120	3,500	3,640	4,400	5,400
Liberia	—	—	—	—	60	60	80	150	120	100	100	48	36
Namibia	1,170	1,520	1,120	1,312	1,382	1,402	1,345	1,394	1,630	1,450	1,487	1,350	1,650
USSR/Russia[c]	10,000	9,000	8,000	8,500	10,500	10,500	10,500	11,500	11,500	11,600	11,600	11,500	12,000
Sierra Leone	160	180	90	155	113	162	300	200	7	58	167	147	214
South Africa	3,800	4,600	4,600	4,340	5,070	4,400	4,500	4,300	4,000	4,320	4,470	4,350	5,070
Other	2,433	2,737	2,612	2,746	2,117	1,853	2,568	2,235	2,883	3,300	3,122	2,888	2,910
Total	51,000	57,300	47,700	51,400	55,700	55,500	56,600	58,900	60,600	61,200	64,500	70,600	80,900
Industrial													
Angola	62	80	15	30	300	250	124	364	373	435	517	502	530
Australia	17,978	22,095	23,032	23,815	22,400	23,096	22,100	22,500	16,381	14,612	14,397	18,500	18,200
Botswana	4,950	4,790	4,420	5,000	5,300	5,000	5,000	5,000	5,730	6,160	6,600	7,100	7,600
Zaire/D. R. Congo	14,814	4,567	13,620	13,000	13,000	17,000	17,600	18,900	16,000	14,200	14,560	17,456	21,600
Liberia	—	—	—	—	90	90	120	150	80	70	70	32	24
Namibia	20	30	20	—	—	—	71	73	—	106	—	—	—
USSR/Russia[c]	10,000	9,000	8,000	8,500	10,500	10,500	10,500	11,500	11,500	11,600	11,600	11,500	12,000
Sierra Leone	83	116	68	100	101	108	100	50	2	19	56	205	296
South Africa	4,600	5,600	5,700	5,343	5,880	5,550	5,540	6,460	6,010	6,470	6,700	6,530	7,600
Other	2,300	2,206	2,488	2,561	2,505	2,663	2,201	2,326	1,553	1,646	1,621	1,638	1,632
Total	54,800	48,500	57,400	58,300	60,100	64,300	63,400	67,300	57,600	55,300	56,100	63,500	69,500
Grand total	106,000	106,000	105,000	110,000	116,000	120,000	120,000	126,000	118,000	117,000	121,000	134,000	150,000

[a] Totals may not match individual values because of rounding. A "—" in a block indicates no production or negligible production reported. Sources: Balazik (1995); Olson (1999, 2003). Note that other sources may use different numbers because much of the information is based on estimates.

[b] Total production. Separate figures for industrial diamonds not available.

[c] All Russia/USSR data before 2003 are based on estimates, with output believed to be 50% gem and 50% industrial.

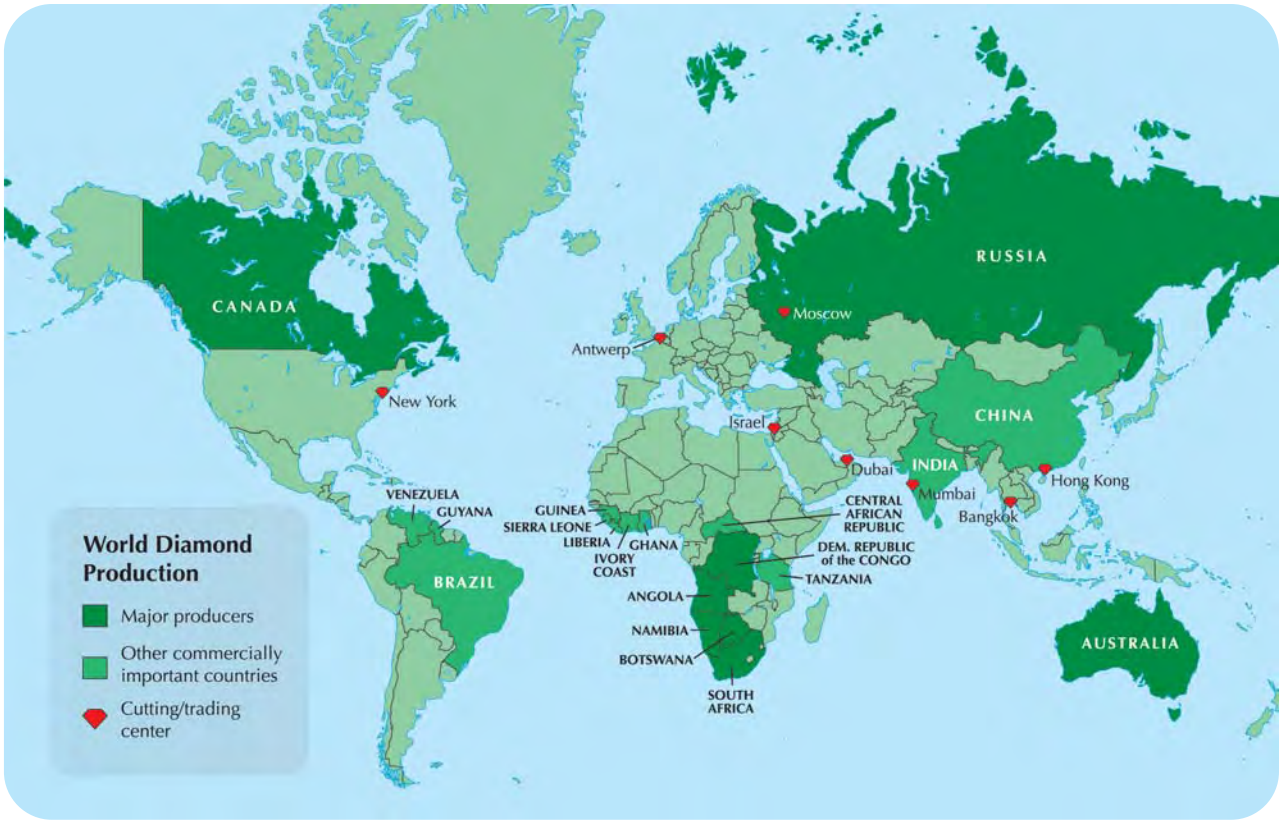

Figure 2. Diamond production in the 1980s was largely concentrated in southern Africa, with a few major mines in Australia and the USSR. There are now major producing countries (dark green) on every continent except South America and Antarctica; these eight countries accounted for over 95% of world production by volume in 2003. Approximately a dozen other countries (medium green) produce commercially significant amounts, though far less than the major producing nations. The major cutting and trading centers are indicated with a red diamond. Modified from Boyajian (1988).

own mines. First, the end of the Soviet regime unleashed a torrent of rough diamonds from the country's stockpiles and a desire among a number of Russia's senior government officials and members of the diamond hierarchy to become more independent.

Second, a temporary truce in Angola's decades-long civil war during the early 1990s created an opportunity for thousands of *garimpeiros* (independent miners who often use only rudimentary tools), many of them recently demobilized soldiers, to dig for diamonds in the country's alluvial fields. Suddenly hundreds of thousands of carats of diamonds, typically of better qualities, were being sold through offices in Luanda and Antwerp. The CSO reportedly bought some $600 million of such goods to remove them from the market (and thus keep prices stable) in 1996 alone (Shor, 1996d). This decision caused an abrupt increase in De Beers's diamond stocks, drawing criticism from the financial community. Although the CSO purchased Angolan diamonds using its own funds, without borrowing, investors believed such a stockpile was a growing liability, and the price of the company's stock ultimately fell because of it (De Beers Consolidated Mines, 1997). In addition, because De Beers executives had made the high-quality goods flowing from Angola such a priority, they were disinclined to protect the market for small diamonds. This concerned Argyle executives and contributed to their decision not to renew their marketing agreement with the CSO (Shor, 1996c).

Third, the discovery of diamonds in Canada introduced a large rival mining corporation, BHP, to the diamond market, thus creating another formidable distribution channel outside the CSO.

Finally, after 1999 the CSO (renamed the Diamond Trading Company, or DTC, in 2000) stopped buying goods on the outside market in order to reduce its large diamond stockpile, which had grown to $4.8 billion (De Beers Consolidated Mines, 2000). In addition, it did not want to handle so-called conflict diamonds from embattled nations

Figure 3. De Beers's historical dominance of the rough diamond market is founded on its ownership of several large mines in South Africa. Shown here is the Venetia mine north of Messina, where full production of 3.6 million carats was achieved in 1993. Venetia is South Africa's most productive diamond mine and one of the most modern diamond mining facilities in the world. Courtesy of the DTC.

(discussed below). By this action, the company put the industry on notice that it would no longer serve as custodian for the trade

Thus, as the 21st century opened, De Beers's share of rough diamond sales had been reduced sharply to some 50% by value, ending its role as single-channel marketer and reducing its ability to regulate supplies and prices—particularly of polished goods under a carat.

Russia. One of the most significant and tumultuous events of the late 20th century was the collapse of the Soviet Union in 1991–92. Under the Soviet system, government agencies closely controlled all diamond operations. Since these goods first reached the international market around 1963 (Even-Zohar, 2002), the Soviets sold most of their diamond production to the CSO through intermediaries. In the 1970s, they developed their own diamond-cutting facilities and, by 1978, about $400 million of their production was allocated to these ventures (EIU, 1979).

Soviet diamond-mining and marketing operations remained fairly stable until the mid-1980s, when then-premier Mikhail Gorbachev embarked on an ambitious program—*perestroika*, or restructuring—to modernize the Soviet economy. As part of this program, in 1990 De Beers agreed to loan the Soviets $1 billion. As collateral, a significant portion of the USSR's diamond stockpile was transferred to De Beers's CSO headquarters. The deal also included a five-year agreement allowing De Beers exclusive marketing rights to new diamond production (Shor, 1993).

The end of the Soviet regime led to a new diamond industry structure that divided power and profits between the central government in Moscow and the local authority in Sakha, the semi-autonomous republic that produces 98% of Russia's diamonds. The mining and marketing of diamonds from the Russian Federation was placed under a "joint-stock" (cooperative venture) agency known as Almazziirossi-Sakha (now shortened to Alrosa), Russian for "Diamonds of Russia and Sakha." Ownership of Alrosa is divided as follows: Sakha Republic, 40.5%; the central Russian government, 32.5%; other government agencies, 27%.

Alrosa took 80% of Russia's yearly rough production of approximately $1.2 billion; the Republic of Sakha took the other 20%. Those shares continue today. With the dissolution of the USSR, Alrosa continued to honor a clause in the 1990 agreement with De Beers that required it to sell 75% of its rough production to the CSO. The remaining 25% would go to Russian polishing operations or be sold through Alrosa's office in Moscow. At the same time, Sakha signed its own contract with the CSO to sell all of its production, apart from a provision for unspecified allocations to local polishing operations. This would prove problematic.

The 1990 agreement contained several critical loopholes: It did not include goods from Russia's estimated $3 billion stockpile, which were administered by a different agency controlled by the central government (Komdragmet, later called Gokhran); it did not define or limit the scope of "domestic" polishing operations (most of which were in fact newly

created joint ventures with Antwerp or Israeli manufacturers); and it did not include sales of "technical" (industrial) diamonds (Shor, 1993).

By 1992, diamonds were pouring through these loopholes, depressing prices—particularly of small goods. Worse for De Beers, some of the 37 cutting operations did little more than polish a window onto a rough diamond and export it as "polished" (Even-Zohar, 2002). An estimated $5 billion worth of rough diamonds thus leaked into the market during the mid-1990s (Pearson, 1998). The influx of so many diamonds caused serious instability in the diamond market.

In October 1997, after two years of difficult negotiations, the Russian government and the CSO finally signed a new contract that would last until the end of 1998. It was based on a complex formula stipulating that Russia, through Alrosa, sell the CSO a minimum of $1.2 billion of rough diamonds, drawn from both new mine production and the stockpile. The agreement closed two crucial loopholes: It banned the export of partially manufactured diamonds, and it tightened the standards for "technical" diamonds so they were much closer to the trade's definition of *industrial* (Shor 1997b, 1998a).

Figure 4. De Beers has traditionally brought all its rough diamond production to CSO/DTC headquarters in London, where it is mixed and sorted into thousands of categories before distribution to sightholders. This practice is being challenged, as producing nations seek to retain a portion of their rough for local cutting and polishing. Courtesy of the DTC.

After 1997, Alrosa shifted its priorities to the 90 domestic diamond-polishing factories operating in Russia, including several it established through a subsidiary, Brillianty Alrosa. That company alone sold $130.7 million in polished diamonds in 2001 (Alrosa, 2002).

De Beers and Alrosa concluded another five-year agreement in 2001, which required that the latter sell De Beers a minimum of $800 million worth of rough annually, approximately half of Sakha's total production (De Beers Consolidated Mines, 2001). However, the following year, the European Commission (the executive body of the European Union) began a lengthy review process to determine whether or not this supply arrangement violated anti-competition regulations. While the matter remains pending, De Beers and Alrosa agreed to a substantial phased reduction of their rough diamond dealings, with Alrosa selecting "approximately 15 clients" to supplement De Beers (Rapaport, 2004b). The result certainly will thrust Alrosa into a more competitive stance against the DTC as the decade progresses.

At the opening of 2005, the Russian government issued official diamond production figures for the first time ever. In 2003, 33.02 million carats (Mct) of rough was produced, valued at $1.7 billion (an average of $51 per carat; this figure is higher than those given in table 1, which are based on earlier data). Interestingly, for the same year, Russia listed rough exports of 37.8 Mct valued at $883.4 million, or $23 per carat ("Russian diamond production…," 2005), which indicates that it was still selling large stocks of industrial and lower-quality cuttable diamonds from its stockpile.

Australia. Australia's Argyle diamond mine was developed in the early 1980s. The sheer volume of the mine's production—42 Mct yearly at its peak—served as a catalyst for a number of important changes in the world diamond market. In particular, the millions of carats of predominantly small near-gem diamonds (very low quality rough from which some gem material can be extracted) coming from Argyle provided the raw material for the exponential growth of India's diamond manufacturing industry. Moreover, the marketing of Argyle's (predominantly brown) colored diamonds fostered a much greater consumer awareness of such stones.

When the mine began production, its major partners, Ashton Mining and CRA Mining (CRA merged

with RTZ in 1995 and took the name *Rio Tinto* two years later), signed a deal to sell the CSO 75% of their yearly output. Approximately 40% of these diamonds could be fashioned into polished goods—albeit, for the most part, of very low quality—by India's low-wage manufacturing force (the effects on India are detailed below). At first, these vast quantities of smaller, lower-quality material were easily absorbed by fast-growing U.S. mass merchandisers, who found a market niche for affordable diamond jewelry. However, Argyle production neared full capacity by 1991 as the U.S. economy fell into a recession, swelling inventories of small diamonds in the cutting centers. Then the large, unregulated flow of small diamonds from Russia in the early and mid-1990s (discussed above) depressed prices and bloated inventories, prompting De Beers to impose a 25% reduction in its purchases of rough from each producer (Shor, 1996b). The move generated unease among Argyle executives, who believed De Beers had failed to support the market for small diamonds at the same time that it had propped up the market for larger diamonds when supplies of such goods from Angola threatened to overwhelm the pipeline.

As a result, Argyle declined to renew its sales contract with De Beers in 1996. This decision sent fears of a price war between the CSO and Argyle circulating through India's diamond industry.

Argyle also broke precedent with other diamond producers by launching its own marketing campaign, beginning in 1990 (Shor, 1991). The company developed a sales organization and marketing initiatives aimed at driving demand for smaller diamonds and the millions of carats of brown goods the mine produced, which it christened "champagne" and "cognac" (Shor, 1991; figure 5). Argyle then focused on promoting finished jewelry made by major purchasers of its diamonds, hiring jewelry manufacturing technicians to assist these firms in developing products and services compatible with American retailers' requirements (Shor, 1994) and engaging a marketing organization (Market Vision International [MVI]) to facilitate access to U.S. retailers at major trade shows. By 2004, India's diamond jewelry exports had topped $2 billion, nearly two-thirds of which were destined for U.S. retailers (Weldon, 2004a).

While achieving success at building demand for its clients' products, Argyle's owners were faced with a critical decision as the millennium neared: The projected "life" of the mine's open-pit operation (figure 6) was coming to an end. Production had nearly halved to 26.2 Mct by 2001, after Rio Tinto conducted a redevelopment project to extend its life. This reduction in Argyle's output created a large overcapacity of diamond manufacturing in India, which touched off a heated competition for rough supplies to keep the many operations going (Gross, 2003). By mid-2005, the projected cost of converting Argyle into an underground mine was estimated at A$1.05 billion (US$800 million). Rio Tinto has pressured the Western Australian government for aid and concessions on the 22.5% it pays in royalties to keep the mine operating past 2008 (Tanna, 2004a; "Argyle expansion…," 2005). Closure of Argyle would exacerbate the overcapacity of India's diamond-manufacturing operations, particularly in Ahmadabad, where vast quantities of those stones are polished.

Figure 5. During the 1990s, a series of marketing initiatives by the owners of the Argyle mine in Australia helped make fine brown diamonds such as these (0.35–1.32 ct) an important segment of the colored diamond market. Photo © Robert Weldon.

Canada. The 1991 discovery of diamond-bearing kimberlite at Lac de Gras in Canada's Northwest Territories was the first significant diamond find in North America. Ultimately, the Canadian mines would become the first major operations in recent times to sell the majority of their production outside the CSO from the beginning.

By the time the mine finally opened in October 1998, BHP Minerals (now BHP Billiton) had established a marketing subsidiary, BHP Diamonds, which opened a sales office in Antwerp, run in cooperation with rough diamond dealer IDH Diamonds (Shor, 1999). In the first two years of operation, Ekati's main pipe, Panda, yielded a total of 2.7 Mct, about 2% of world diamond production by weight and 5% by value. By 2003, annual production had increased to 4 Mct, worth just over $600 million (Rio Tinto Diamonds, 2003).

In 1999, BHP Diamonds signed a three-year agreement with the CSO to market 35% of the mine's production by volume. At the end of that agreement, BHP chose to market its entire production itself (Even-Zohar, 2002). BHP now distributes the vast majority of its production through its Antwerp sales office in a manner similar to the DTC sights: selling to a regular clientele at scheduled intervals. In a break from the existing DTC policy, however, BHP announced it would adjust prices to market forces. (Through much of Ekati's life, however, downward adjustment has not been necessary [G. Nicholls, pers. comm., April 2004].)

The discovery of diamonds at Ekati touched off a huge exploration rush that resulted in the discovery of another major deposit nearby. Aber Resources Ltd. located a cluster of kimberlite pipes under a lake just southeast of the Ekati concession. The site, later named Diavik, was promising enough to attract Rio Tinto as a 60% partner. Tiffany & Co. also took a stake in the venture (see below for details).

With the opening of Diavik (figure 7) in 2003, Canada became the world's sixth largest diamond producer by volume (an estimated 12.6 Mct in 2004) and third by value (an estimated $1.6 billion), according to Even-Zohar (2005).

Following Ekati's lead, Rio Tinto chose to market its own production directly rather than through the DTC. As discussed above, by then the company had developed a sophisticated marketing operation for its Argyle production, giving it a ready-made sales organization with extensive contacts throughout the diamond pipeline, from Indian manufacturers to American retailers.

New Competitors: Lev Leviev, LLD. One of De Beers's principal competitors to emerge in the late 1990s was a former client, Lev Leviev (figure 8), who had set a goal of establishing a truly independent diamond operation. This required owning or controlling sources of rough diamonds (Weldon, 2002).

In 1989, Leviev, a naturalized Israeli citizen born in Uzbekistan, found his first diamond source close to his homeland. His company, then known as LID, formed a joint-venture diamond manufacturing operation with Alrosa. The venture, called Ruis (short for Russia/Israel), had direct access to Russia's rough diamond resources. Eventually, Leviev acquired full control of Ruis, which in 2002 manufactured $140 million in polished goods (Berman and Goldman, 2003). The release of Russian rough to cutting operations during the early 1990s was the catalyst that helped Leviev become the first significant competitor to De Beers in the control and distribution of rough diamonds.

Figure 6. The huge volume and unique characteristics of Argyle's production have wrought enormous changes in the diamond market over the past two decades, from driving the growth of India's polishing industry to supplying greatly increased numbers of fancy-color diamonds. The Argyle open-pit mine is nearing the end of its production life, and its potential closure in the next decade is a source of uncertainty in the markets it helped create.

Figure 7. In little more than five years, Canada's diamond production grew from negligible to third in the world by value. Total 2004 production at the Diavik mine on Lac de Gras in the Northwest Territories (left) exceeded 7 million carats. Photo by Mark L. Craigshead.

As Ruis expanded, Leviev secured ever-greater amounts of rough from both Alrosa and Komdragmet/Gokhran. In 1999, he invested the profits from this operation in contracts to obtain rough from another major diamond producer, Angola (Berman and Goldman, 2003).

Figure 8. Former De Beers sightholder Lev Leviev built a multi-billion-dollar diamond mining and manufacturing company during the 1990s through his partnerships with Russian and Angolan diamond producers. LLD Diamonds is now second only to De Beers in rough diamond sales worldwide. Photo by Robert Weldon.

Leviev took advantage of De Beers's departure from Angola in 1998 to gain access to its diamond production. He presented a plan to Angola's government to increase revenues by marketing diamonds through a single entity. The Angola Selling Corp. (Ascorp) was created from this initiative, and the government awarded Leviev a 25% stake in it (Weldon, 2002). Leviev also won a share of Sodiam, an Angolan government agency set up to buy diamonds from alluvial concessions, which then marketed its diamonds through Ascorp.

Since 2000, Leviev has also invested heavily in offshore diamond mining in Namibia and obtained contracts to market rough from the Democratic Republic of the Congo (see below). These operations helped his company, now called LLD Diamonds, achieve about $1 billion worth of rough diamond sales in 2002 (Even-Zohar, 2002), putting him ahead of such major diamond producers as Rio Tinto and BHP Billiton. In 2004, Leviev expanded his diamond manufacturing operation to Namibia, where he purchased a deep-sea mining operation, and announced plans to open a polishing facility in Botswana.

In 2005, however, Leviev's position as principal marketer of Angolan diamonds was challenged by Israeli manufacturer Dan Gertler, of DGI Group, which won a contract to sell 300,000 carats monthly from the country's largest mine, Catoca (Helmer, 2005). In addition, De Beers reestablished its exploration and mineral rights in the diamond-bearing province of Lunda Norte (Miller, 2005b).

African Producers. De Beers's biggest challenge in the coming decade will be to adapt to demands from the governments of South Africa, Namibia, and Botswana to exert greater control over their respective diamond resources and obtain more domestic benefits (primarily increased employment) from De Beers's diamond-mining operations. At mid-decade, producer-country governments, the DTC and, to a lesser extent, other mining companies are still in difficult negotiations over an effective balance between local beneficiation and economically efficient enterprise. Ultimately, this could cause De Beers and other mining concerns working in these nations to sort and market the bulk of their productions locally, instead of mixing them in a central facility, as is the current practice. The outcomes remain far from certain; however, the shift toward local diamond manufacturing undoubtedly will affect pricing, profits, and the availability of goods throughout the entire diamond pipeline.

South Africa. In 2002, 10.9 Mct of diamonds were mined in South Africa, 95% by De Beers–controlled mines (Coakley, 2002). As 2005 began, South Africa's legislature was debating a controversial initiative designed to bring much greater beneficiation to the country, and it had mandated that blacks share in the ownership of the country's mineral resources, including diamonds. This legislation package is an important part of the government's Black Economic Empowerment (BEE) policies, which seek to integrate the country's majority population into its large corporate community (Mbeki, 2004; Mlambo-Ngcuka, 2004).

The legislation would put into practice principles espoused in the country's new Mining Charter, which asserts that all mineral resources are the property of the people of the country, with the state holding custodial rights. The laws would cede broad discretionary powers to the minister of minerals and energy in granting and administering prospecting and mining operations, require mining companies to set aside a percentage of rough diamonds for local manufacturing, and allow domestic cutters first refusal rights on rough diamonds.

Then–minister of minerals and energy (now deputy president) Phumzile Mlambo-Ngcuka (figure 9) told attendees at the 2004 Antwerp Diamond Conference that "local cutters should be empowered to decide what they can and cannot cut rather than producers who are keen to sell outside [South Africa]" (Mlambo-Ngcuka, 2004). However, experiences in Canada's Northwest Territories (NWT) demonstrated the difficulties of such operations. In 2005, Sirius Diamonds, a cutting facility established with aid from the provincial NWT government, went bankrupt. De Beers chairman Nicky Oppenheimer, addressing a gathering of African mining ministers on February 8, 2005, noted that diamond manufacturing in high-wage countries (e.g., South Africa) can run $40–$50 per carat, yet must compete with large,

Figure 9. The end of apartheid helped bring about significant changes in the diamond industry's once-intimate relationship with the South African government. In recent years, government officials such as president Thabo Mbeki (left) and deputy president Phumzile Mlambo-Ngcuka (right) have forcefully lobbied for greater local benefits for the South African people, such as black ownership of mining resources and expanded local cutting operations. Photo © Mike Hutchings/Reuters/Corbis.

automated Indian operations, where costs run $10–$12 per carat (Robinson, 2005a). Thus, governments would be forced to subsidize the operations with tax revenues or by requiring the industry to allow such operations to "cherry pick" material that can be profitably manufactured, leaving less-profitable material for manufacturers in other cutting centers (Pearson, 2004; Priddy, 2005).

Although Oppenheimer further noted at the February 2005 meeting that heavy-handed legislation could lead to "disengagement" between the government and mining companies, the company hastened to comply with South Africa's demands. In June 2005, the DTC added five South African sightholders for a total of 19 in that country. These additional sights were allocated to companies compliant with South Africa's BEE programs, which include black partners or substantial black investment (Miller, 2005a).

The governments of Namibia and Botswana also have called for beneficiation projects within their borders, though far less sweeping than South Africa's proposals (Even-Zohar, 2004; Benson, 2005).

Figure 10. As African governments seek greater local benefits from their diamond resources, one primary goal is the successful development of local polishing operations. Shown here is a sawing line at the Namcot Diamonds plant in Windhoek, Namibia, operated by the Steinmetz Group. The economic viability of these operations is uncertain, since they must compete with manufacturers in countries such as India that have much lower labor costs. Photo by Brendan Laurs.

Namibia. This country has been a producer of high-value marine diamonds for nearly 100 years. Production averaged about $275 per carat in 2000 (Even-Zohar, 2002). After Namibia achieved independence in 1990, newly elected president Sam Nujoma negotiated with De Beers, which owned all of the major diamond-producing concessions, to transform mining operations into a 50-50 government–De Beers corporation called Namdeb, created in 1994. Nujoma later encouraged other diamond producers and manufacturers to invest in the country, with the eventual goal of having 90% of Namibian-mined diamonds polished locally. As of mid-2005, five local polishing operations (see, e.g., figure 10) had been established, including a 550-worker facility opened by Lev Leviev.

At a November 2004 ceremony in Windhoek, De Beers managing director Gary Ralfe offered to help the government develop skills and jobs in the country, which produced 1.65 Mct in 2003 (Tanna, 2004b). In mid-2005, Ralfe opened a branch of Diamdel, the DTC's rough diamond distribution subsidiary, in Windhoek to supply local diamond-manufacturing operations (De Beers Group, 2005).

Botswana. De Beers and the Republic of Botswana have been partners in the world's largest diamond reserves since 1967. There are three major diamond mines in the country—Orapa, Jwaneng (figure 11), and Letlhakane—and a smaller, newly opened operation, Damtshaa. These are owned jointly by De Beers and the government of Botswana through a 50-50 venture, Debswana.

The sheer volume of Botswana's production, 30.4 Mct valued at $2.4 billion in 2003 (Debswana, 2003), combined with the fact that diamond revenues account for 35–40% of the country's gross domestic product, have placed the two entities into an interdependent relationship. This was formally sealed in 2001 when Botswana became the first diamond producer to gain an ownership stake in De Beers. Debswana took a direct 11% share, and an indirect 4% share when De Beers reorganized as a private concern that year (discussed in detail below; De Beers Consolidated Mines, 2001; Even-Zohar, 2002). Botswana president Festus Mogae made it clear in a November 2002 talk in Antwerp that diamonds have been the key to his country's rapid development and ascendance into a middle-class society, according to World Bank classifications.

Despite their close relationship, De Beers and the government of Botswana have engaged in hard

Figure 11. The enormous production of Botswana's diamond mines, such as Jwaneng (left) has been the key to that country's evolution into a stable middle-class democracy. The imperative to use diamonds to promote development in Africa is an important challenge for the 21st century diamond industry. Courtesy of the DTC.

negotiating sessions over renewals of mining leases and marketing contracts. The cession of Debswana's stake in De Beers to the government was one outcome of the talks over the renewal of the 25-year Jwaneng license in 2004 (Katz, 2004b).

CONFLICT DIAMONDS

While mining companies and governments vied to develop and control kimberlite deposits, the alluvial fields of western (Sierra Leone), central (Democratic Republic of Congo [DRC]), and southern (Angola; figure 12) Africa brought to official and public attention, for the first time, concerns over the origins of diamonds. Civil wars in these regions sparked a series of United Nations sanctions on trading diamonds from those countries, beginning in 1998. These stones became known as "conflict diamonds," which the U.N. officially defined in 2000 as: "Diamonds that originate from areas controlled by forces or factions opposed to the legitimate and internationally recognized gov-

Figure 12. One of the most dramatic changes in the diamond industry in recent years has been greater attention to the source of rough diamonds. As governments and rebel groups in Africa increasingly used diamond revenue to fund wars and atrocities, the industry was forced to enact restrictions on rough trading based on where the diamonds were mined. This 2001 photo shows an alluvial pit near the town of Saurimo in Lunda Sul Province, Angola. Photo © Teun Voeten; courtesy of Panos Pictures.

ernments, and are used to fund military action in opposition to those governments, or in contravention to the decision of the Security Council" (*Conflict Diamonds*, 2001, p. 1).

Angola. Shortly after Angola achieved independence from Portugal in 1974, following a revolution led by the Movimento Popular da Libertação de Angola (MPLA), the country fell into civil war. Because of the MPLA's Marxist nature, Angola immediately became embroiled in the Cold War struggle between the U.S. and the Soviet Union. For much of the 1970s, however, the Marxist inclinations of Angola's government did not deter it from continuing the country's relationship with De Beers. By 1980, most of the resistance to Angola's existing MPLA government had coalesced around a former army general, Jonas Savimbi. The general won the support of many organizations in the U.S. with his promise to bring democracy to his country.

During the 1980s, Savimbi's União Nacional para a Independencia Total de Angola (UNITA) began targeting the country's diamond operations and selling captured diamonds via networks that ran through Lisbon to Antwerp (Shor, 1986). Angola's state-run diamond marketing agency, then called Diamang, reported that the country's official diamond production had declined nearly two-thirds, to 700,000 carats, by 1986.

In the early 1990s, UNITA and the MPLA government reached a U.N.–brokered accord. When the cease-fire unraveled in 1993, Savimbi and his forces retreated to the eastern end of the country, which includes two major diamond-producing areas, Lunda Norte and Lunda Sul. That same year, the U.N. Security Council adopted Resolution 864 imposing an arms embargo against UNITA and establishing a committee to monitor UNITA's activities.

In 1998, after another failed peace initiative in Angola, the U.N. Security Council adopted Resolutions 1173 and 1176, which prohibited the direct or indirect import from Angola of all diamonds not accompanied by a certificate of origin issued by the government of Angola, and imposing financial and travel sanctions on UNITA and its leaders (Fowler, 2000; *Conflict Diamonds*, 2001). That same year, a London-based nongovernmental organization (NGO), Global Witness, charged that U.N. member states, including Belgium, "were doing very little to enforce the U.N. embargo . . . and are wittingly or unwittingly providing the diamond industry with the wherewithal to exploit loopholes … to maintain the multi-million dollar trade" (Global Witness, 1998, p. 15). Shortly after this, De Beers stopped all purchases of rough diamonds from Angola on the grounds that their legitimate origins could not be verified (De Beers Consolidated Mines, 1999).

Sierra Leone and the Democratic Republic of the Congo. In these two countries, diamond production came from two sources: "official" output by government-controlled or sanctioned enterprises, and "unofficial" diggings by *garimpeiros*. Many of these *garimpeiros* were, in effect, workers indentured to local officials or dealers (Shor, 1988a). In the DRC (formerly Zaire), all the official diamond production went through MIBA, the government-dominated agency that controlled large alluvial concessions along the country's southern border with Angola. However, *garimpeiros* occupied most of the other diamond areas, out-producing MIBA by as much as three times in terms of value. This deprived the state of millions of dollars in revenues because most of these diamonds were either smuggled out of the country or, if legally exported, greatly undervalued (Shor, 1986). These diamond-producing areas were the targets of incursions by troops from neighboring countries in 2001–2003.

By the late 1990s, a civil war in Sierra Leone began escalating into a series of horrific atrocities. The Revolutionary United Front (RUF), under Foday Sankoh, broke a year-long cease fire by systematically killing or mutilating the populations of entire villages in the country's diamond-producing areas. The RUF's tactics galvanized the international human rights community into pressuring the diamond industry to act against conflict diamonds.

On November 1, 1999, U.S. congressmen Tony Hall and Frank Wolfe introduced legislation (the CARAT Act) that would require importers of rough and polished gem diamonds and diamond jewelry to provide written certification of the country in which the diamonds were mined (Rapaport, 1999).

As the fighting in both Angola and Sierra Leone intensified, the U.N. issued a report on the conflicts, directed by Canadian ambassador Robert Fowler (2000). The report detailed how rulers of countries neighboring Angola profited by allowing rebel groups to export diamonds through their countries despite the sanctions. Following this report, human rights groups claimed that as much as 15% of all diamonds in the market were "conflict;" De

Figure 13. The Kimberley Process requires that all diamonds crossing the borders of KP-participating countries be accompanied by a certificate such as the one shown here (a sample issued by the United Arab Emirates). The certificate must warrant that the diamonds have been purchased from legitimate sources not involved in funding conflicts and in compliance with U.N. resolutions.

Beers estimated the number at about 3% (Shor, 2000). The difference lay in the fact that the NCOs counted all diamonds traded outside legitimate channels (known as "illicit" diamonds) as "conflict," while De Beers counted only those coming from Angola's and the DRC's war zones.

The World Diamond Council and the Kimberley Process. During July 17–19, 2000, the World Federation of Diamond Bourses (WFDB) and the International Diamond Manufacturers Association (IDMA) established the World Diamond Council (WDC), a representative body comprised of diamond manufacturers and industry organizations such as the HRD, Jewelers of America, the Jewelers Vigilance Committee (JVC), and CIBJO, among others. GIA, as a nonprofit public benefit corporation, also provided assistance, particularly with technical information. The council was charged with developing policies and procedures that would allow the industry to help U.N. and government efforts to end the trade in conflict diamonds.

In December 2000, representatives from diamond-producing nations (including South Africa, Botswana, Russia, Namibia, and the official governments of Sierra Leone and Angola) and diamond-processing nations (including Belgium, Israel, India, and the U.S.) convened in Kimberley, South Africa. After some initial objections by producing countries, the representatives agreed to work toward a scheme that would allow diamonds from nonconflict areas to be traded freely once their origins were certified. Their efforts to make this plan a reality came to be known as the Kimberley Process (KP).

Fifty-three nations ratified the Kimberley Process at a meeting in Interlachen, Switzerland, in November 2002. The certification requirements took effect January 1, 2003. To participate, nations had to require that all rough diamonds passing through their borders carry KP certificates (see, e.g., figure 13). In addition, no imports would be permitted from nonparticipating countries. Critics of the Kimberley Process, including NGOs and the U.S. General Accounting Office, believed the certification scheme was meaningless without independent verification (Smillie, 2002).

By 2003, the governments of Angola, Sierra Leone, and the DRC controlled enough of their diamond resources that they could join the Kimberley Process and use diamond revenues to help rebuild their countries. Even though the Kimberley Process expelled the Republic of the Congo in July 2004 for noncompliance with its procedures, its chairman noted that the KP still covered 99.8% of global diamond production (Martin, 2004). Non-KP producers reportedly accounted for no more than 250,000 carats; the majority of these non-KP goods originated from countries, such as Liberia and the Republic of the Congo, that border diamond-producing nations and have traditionally been used as conduits for illicit diamonds. Although the conflicts that led to the creation of the KP have ended, the KP's continued role will be that of preventing the use of diamonds to

support future armed conflicts by keeping them out of illicit channels (Martin, 2004).

Terrorist Attacks, 9/11, and the PATRIOT Act. The broader subject of illicit diamonds became more critical after the terrorist attacks of September 11, 2001, when allegations of diamond-funded terrorism became an issue, and the U.S. government began investigating funding sources of al Qaeda and other terrorist organizations. Although reports by Global Witness (2003) and *Washington Post* reporter Douglas Farah (2004) linked certain Lebanese diamond trading firms to terrorist organizations, subsequent investigations turned up no evidence of sustained, ongoing diamond trade by terrorists or their sympathizers.

The final report of the National Commission on Terrorist Acts, the official U.S. body investigating the 9/11 attacks, was released on July 22, 2004. The 585-page report stated that there was "no persuasive evidence that al Qaeda funded itself by trading in African conflict diamonds" (National Commission on Terrorist Attacks, 2004, p. 171).

The 9/11 attacks were also the catalyst for legislation requiring that the financial industry show greater accountability in its international dealings. The Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism (USA PATRIOT) Act was signed into law October 26, 2001; one of its many purposes was to curb funding of terrorist organizations. Under authority granted by the Act in April 2002, the U.S. Treasury Department designated gem and jewelry dealers as "financial institutions" and subjected the industry to extensive reporting requirements. In response, the JVC took on the role of liaison between the gem and jewelry industry and the Treasury Department to draft rules that would "accommodate the unique nature of the industry" (Gardner, 2004).

In June 2005, the U.S. Treasury Department Financial Crimes Enforcement Network (FinCEN) issued its Interim Final Rule, which requires that all dealers engaged in the business of purchasing and selling precious metals, stones, and jewels adopt certain procedures to ensure they are not aiding money laundering. FinCEN exempted U.S. retail jewelers who purchase gemstones and jewelry exclusively from U.S.–based dealers on the grounds that these suppliers were already covered.

The European Union and other countries have adopted similar measures. Today, proponents of African development are looking to the Kimberley Process and anti–money laundering regulations to ensure that diamonds are exported through legitimate channels, which has the added benefit of allowing producing governments to derive the maximum possible revenues from their diamond resources.

MANUFACTURING TECHNOLOGY

Until the early 1990s, the process of polishing diamonds had changed little from traditional methods developed during the previous century. Most diamond-cutting procedures were still accomplished by hand (Caspi, 1997). The main exception was the automated polishing machine for round brilliants, introduced by Piermatic in the 1970s. During the late 1980s, however, a confluence of events and technologies revolutionized the diamond-cutting process, allowing goods to come to market much more quickly and efficiently. They also increased yield significantly, by giving manufacturers many more options, and permitted new shapes to be fashioned economically.

The most important event was the rise of Indian and other Asian manufacturers in the quality-diamond field, which forced diamond manufacturers in so-called traditional centers, Israel in particular, to look at automating their operations to remain competitive. Indian labor costs ran one-fifth to one-sixth those of Israeli workers (Caspi, 1997). In addition, Asian consumers—the Japanese in particular—were very sensitive to the quality of diamond cut (Shor, 1996e). Moreover, as price competition among retailers intensified, diamond manufacturers were compelled to derive the maximum yield from their rough without sacrificing beauty.

Israeli engineers adapted emerging technologies of lasers, computer imaging, and precision measurement systems to diamond processing. Major producers such as Argyle and De Beers also made improvements in automated diamond-processing equipment, such as polishing and bruting machines, to increase speed, accuracy, and quality (Caspi, 1997).

Lasers had been used by diamond manufacturers since the 1970s to remove dark inclusions, but those early lasers lacked the precision to be adapted to the cutting process, resulting in losses of about 8% of the rough (compared to 1% to 2% by conventional sawing). By the 1980s, though, some manufacturers in India adapted lasers for kerfing (cutting

the groove for cleavers), which accomplished in minutes what took traditional hand workers several hours, and was more accurate. In addition, one laser unit could process 20 diamonds at one time (Shor, 1988b). By the early 1990s, a single technician using a laser system could out-produce 60 hand workers (S. Doshi, pers. comm., 2005).

In the late 1980s, several machines were developed that could automatically brute round diamonds, while still employing the traditional process of grinding one diamond against another (see, e.g., figure 14). These machines replaced traditional bruters, who were among the most skilled and best-paid cutters because they were responsible for deriving the maximum yield. However, even highly skilled bruters produced diamonds that were often slightly out of round, which created problems for faceting machines. Not only did the automatic bruting machines largely solve this problem, but they also helped manufacturers reduce labor costs considerably.

Hand-in-hand with the improvements in the bruting process came the development of automatic centering devices. These could accurately align the rough diamond with the center of the bruting machine, allowing for more precise cutting to manufacturers' requirements and fewer interruptions in the bruting process to readjust a diamond's position on the dop.

By the early 1990s, two things had happened: (1) lasers had improved, with a narrower beam that reduced burn-off; and (2) imaging technology was adapted to allow for precise direction of the laser beam. With these advances, diamond manufacturers could fashion virtually any shape directly from the rough. While greatly speeding up the processing time, as mechanical systems did for round stones, laser bruting of fancies has allowed diamond manufacturers to achieve better symmetry and experiment more freely with new cuts.

Computer technology also transformed the marking process, by which the cutter plans how to divide a crystal most economically. An Israeli company, Sarin, introduced computerized scanning and measuring devices (see, e.g, figure 15) that provided complete measurements of a rough diamond within seconds. The unit scanned the crystal, then evaluated all the possible polished stones that could be derived from it, reducing the need for hand marking and improving yield in the process. In addition, a new generation of automatic grain-finding polishing machines allowed for faster polishing and much better finish as well as for highly accurate symmetry and faceting.

Figure 14. Bruting, or initial shaping of the rough, was once the most difficult and labor-intensive element of diamond manufacturing. The advent in the 1980s and '90s of automatic bruting machines, such as this one by Milano Industries, led to huge improvements in productivity and quality control. Photo by James E. Shigley.

Although such technological innovations meant that diamond manufacturers had to spend millions of dollars outfitting new factories during a time when competition was squeezing profits, they also allowed the production of polished stones with much better symmetry and finish than ever before. This proved to be a catalyst for a consumer revolution that began in Japan and ultimately spread worldwide: premium-cut diamonds.

Figure 15. Once a matter of expert guesswork, the marking and dividing of rough diamonds became a far more precise and efficient process through the development of computerized scanning and measuring systems such as the Sarin DiaExpert (shown here with DiaMension hardware). Courtesy of Sarin Inc.

Figure 16. During the 1980s, Japanese retailers and diamond brokers began using a variety of specialized viewing devices (typically modified loupes) to demonstrate a diamond's optical symmetry. Over the following decade, some of these devices were adopted by manufacturers and retailers in the U.S. as American consumers became more concerned with cut quality. The EightStar Firescope shown here uses a red reflector in the eyepiece to determine which facets are returning light to the viewer's eyes (inset). Inset photo by Jonathan Weingarten.

DIAMOND CUT

The preference for well-made diamonds that Japanese consumers developed during the late 1980s was spurred in large part by the introduction of specially made viewers in retail shops. These viewers displayed a round brilliant diamond's optical symmetry in the form of a "hearts and arrows" pattern created by the reflection of the facets (Miller, 1996; figure 16).

The Japanese example began migrating to the U.S. during the 1990s, as American consumers learned more about diamonds, including the fact that appearance depended as much on cut as on other quality factors. A spring 1997 survey by *JCK* and *New York Diamonds* noted that 15% of retail jewelers—mainly those concentrated at the upper end of the market—said their clients were willing to pay a premium for a "well-made diamond" (Shor, 1997a). Five years earlier, that percentage had been negligible. Also in 1997, Lazare Kaplan International (LKI), which had long based its market niche on "ideal cuts," reported a 50% increase in polished diamond sales (Shor, 1997a).

The following year, GIA published the initial results of its extensive research project on diamond cut, noting that many sets of proportions could result in an attractively cut round brilliant diamond (Hemphill et al., 1998). As the study continued, two additional articles chronicled its findings (Reinitz et al., 2001; Moses et al., 2004). The last of these reaffirmed the original conclusion and provided the scientific foundation for a cut grade based on extensive computer modeling and human observations. The results of the 15-year study also showed that a single cut grading system could accommodate various international preferences.

In 1996, the newly created American Gem Society Laboratories (AGSL) began offering cut grades on diamond reports derived from AGS's then 30-year-old 0–10 system (zero being the best). This development had an immediate effect on Israeli diamond manufacturers who, in producing goods for quality-oriented American retailers, could program AGS's "0" cut-grade parameters into their computerized rough-evaluation machines and manufacture such diamonds automatically (Shor, 1997a).

The growing emphasis on cut gave rise to a new group of entrepreneurs who developed a market niche for diamonds with very high optical symmetry. In addition, diamond manufacturers, often in partnership with retailers, created new cut styles or modifications of existing styles to provide distinction in the retail marketplace and avoid the commoditization of traditional cuts inherent in the diamond price lists and Internet selling.

By 2004, there were at least 101 proprietary diamond cuts competing for attention in the marketplace, only 13 of which had existed prior to 1995 (Overton, 2002, 2004a). Several DTC sightholders, such as Schachter-Namdar (Leo cut) and Rosy Blue (Cento cut), have used such proprietary cuts as an integral part of DTC-promulgated marketing and branding programs that were designed to increase demand and reduce discounting of diamond jewelry at retail.

CONSUMER DEMAND

Consumer demand for diamonds stagnated through much of the 1990s, even registering small yearly declines between 1993 and 1998 (Katz, 2005), because of growing competition from other luxury products and economic problems in several key consumer markets. Demand rose sharply in U.S. dollar terms after 2001, though some analysts maintain that higher sales figures have stemmed more from price increases than actual volume.

While sales in the U.S., the world's largest diamond-consuming market, remained relatively steady, the aggressive entry of discount merchandisers into diamond jewelry during the 1980s put pressure on traditional wholesalers because the large retailers bypassed them to purchase directly from diamond-cutting centers. These retailers used their volume buying ability to wrest control of diamond prices from manufacturers and dealers (Pearson, 1998), thus creating a profit-margin squeeze that has not abated. The relentless discounting by these retailers and, later, major retail jewelry chains, exerted further downward pressure on retail diamond prices. By 2003, the profit squeeze had halved industry margins to 7–8%, prompting concern from leading industry bankers (Gross, 2003). This stagnation of sales in the 1990s contributed to De Beers's decision to embark on a major recasting of its sales and distribution procedures.

Boom and Bust in Asia. Extremes in the Asian markets also played a critical role in pushing De Beers to recast its traditional role as market buffer. Sales of diamond jewelry in the U.S. and Japan (the two biggest markets, consuming nearly two-thirds of all diamond jewelry) ran nearly even from 1988 until the mid-1990s. However, when economic stagnation took hold in Japan in the early 1990s, jewelry sales declined abruptly. As one indication, 79% of Japanese brides received diamond engagement rings in 1995, but only 64% two years later. By 1998, Japan's share of the world market for diamond jewelry had shrunk to approximately 20% (Ralfe, 1999).

Elsewhere in Asia, economic growth in emerging markets such as Korea, Thailand, the Philippines, Malaysia, and China took off in the early 1990s. This caused a dramatic rise in regional diamond jewelry sales, from negligible in 1980 to nearly 7% of world volume by 1995. South Korea, in particular, saw a boom in diamond jewelry consumption, despite various luxury taxes that added more than 50% to the purchase price (Shor, 1997c). Sales of diamond jewelry there reached an estimated $1 billion in 1996, fourth in the world, up from near zero in 1988, when the country first allowed diamond imports. Sales of diamond jewelry in Thailand reached the half-billion-dollar mark in 1995, and De Beers's market watchers were closely monitoring rising diamond sales in the Philippines and Malaysia. Nevertheless, these markets could not compensate for the decline in Japanese demand.

The Asian Collapse. The boom in many Asian nations ended abruptly in 1997, causing an oversupply of diamond inventories (Pearson, 2004). A confluence of forces led to a sharp decline in the region's economy. Several large corporations in Indonesia and Thailand defaulted on loans, setting off runs on those countries' stock markets. Japanese banks, which had been heavily invested in that region, were too preoccupied with troublesome loans in their domestic market to address these problems. Within three months, the currencies of Thailand, Indonesia, and several other Asian nations fell to half or even less of their former values. Shortly afterward, South Korea, mired in its own corporate scandals, saw its currency collapse. Indeed, South Korean consumers began a massive diamond "sell-back" campaign to aid their government, which could no longer meet its international obligations. The International Monetary Fund loaned the country funds to stave off bankruptcy. (A rapprochement between China's government and Hong Kong's business leaders forestalled a crisis in confidence prior to that former British colony's change in government, which occurred July 1 of that year; thus, the problems in other Asian markets had little effect on Hong Kong's diamond industry.)

Diamond sales in the region virtually halted because diamonds, purchased from De Beers's CSO in U.S. dollars, had suddenly become price prohibitive in most of Asia. Retailers, wholesalers, and consumers began a massive unloading of diamonds, many of which were shifted to the U.S. market. Between 1996 and 1998, world diamond jewelry sales fell from $52 billion to $48 billion—despite a $3.2 billion increase in U.S. sales during that period (De Beers Consolidated Mines, 1999).

De Beers reacted quickly by removing so-called "Asian" goods (high clarity, medium color) from its sights in mid-1997, then cutting rough diamond sales by 25% the following year (De Beers Consolidated Mines, 1998). The impact of the Asian collapse and the CSO's cutback on sales left De Beers with a stockpile that, at the end of 1999, stood at a book value of $4.8 billion—not including the large stocks held by Debswana (Ralfe, 1999). This growing stockpile was Asia's contribution to the company's drastic reorganization in 2000 (described below).

New Asian and Middle Eastern Markets. The opening of the new millennium saw a major shift in diamond demand. This helped diamond jewelry sales

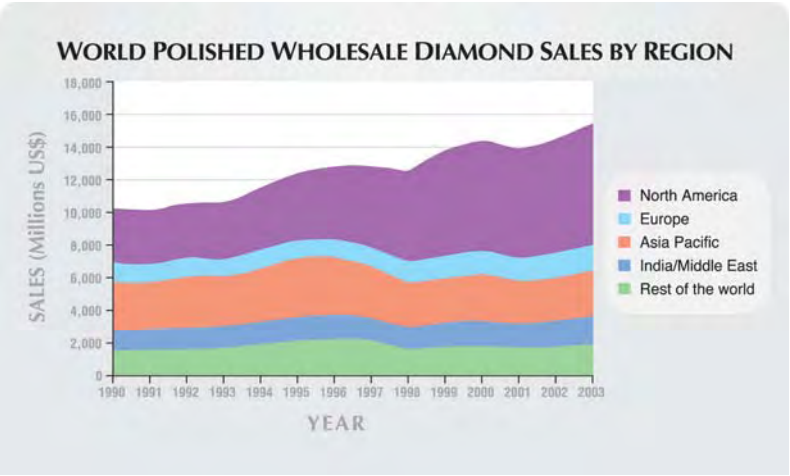

Figure 17. As can be seen from this graph, the North American (primarily U.S.) market has been the main source of growth in world diamond sales since 1990. The United States accounts for nearly half of worldwide diamond jewelry sales. (Source: DTC.)

achieve strong growth worldwide in 2003 (+5.9% to $59 billion) and 2004 (+8.5% to $62 billion). U.S. demand for diamond jewelry ($31.5 billion in 2004) still accounts for nearly half the world's market share (as well as nearly half of world sales of loose diamonds; see figure 17). Nevertheless, in 2004 the consumer market in India grew by 19% to $1.3 billion, in China by 11% to $1.5 billion, and in the Persian Gulf (Dubai, Saudi Arabia, Bahrain, etc.) by 14% to $1.3 billion (Kendall, 2005). Future continued strong growth of these emerging consumer markets could exacerbate shortages of higher-quality polished diamonds and force a rapid increase in prices to U.S. buyers (Singer, 2005).

Television Shopping and the Internet Fuel a U.S. Boom. As the millennium approached, the U.S. stock market had begun cresting on the wave of the "dot-com" boom. New avenues of retailing—TV shopping and, much more importantly, e-commerce—were transforming the diamond jewelry landscape.

Television Shopping. Electronic retailing began with TV shopping during the 1980s. By 1988, two firms—QVC of West Chester, Pennsylvania and Home Shopping Network of St. Petersburg, Florida—had recorded combined yearly sales of $2.5 billion in all merchandise categories. Most of the jewelry tended to be lower-priced "impulse" pieces, averaging about $100 ("The invasion…," 1988). Because of its niche at lower price points and emphasis on "show and tell" visual appeal, TV shopping tended to focus on colored gemstones and gold, with diamonds primarily as accent stones. By 2002, sales of jewelry at QVC had doubled to more than $1 billion, nearly 42% of total company sales. HSN sold an estimated $400 million in jewelry (about 24% of its total sales), while ShopNBC noted sales of approximately $380 million (Beres, 2004). Jewelry Television by ACN, headquartered in Knoxville, Tennessee, reported that its sales grew from $5.2 million in 1997 to $250 million in 2003. The company said its primary customers were people who feel intimidated by the traditional jewelry shopping experience (Gomelsky, 2004a).

The Internet. By the end of the 1990s, the Internet had become a significant outlet for diamonds and diamond jewelry, as well as a major source of consumer information about diamonds. Unlike television, which had a visual emphasis that favored large, popularly priced colored stone pieces, the Internet allowed diamond shoppers to easily compare prices of all sizes of stones with grading reports. Internet jewelry sales jumped from about $38 million in 1997 to $207 million the following year. Although a minute percentage of the sales reported by traditional storefront jewelers in the U.S. ($22.4 billion in 1997), the totals were rising rapidly (Diamond, 1999).

The year 1999 saw a number of large-scale start-up jewelry "e-tailing" operations that drew on multi-million-dollar venture capital loans to begin on-line jewelry sales. Shop.org reported that retail sales in all categories via the Internet totaled $36 billion in 1999. By 2002, that number had doubled; it then jumped 51% to $114 billion in 2003 (National Retail Federation, 2004).

Despite this extraordinary growth in e-tailing, most of the early on-line jewelry operations failed or were absorbed by stronger competitors. High fixed costs of fulfillment operations, thin sales margins, and a still relatively small customer base made prof-

itable operations difficult. As a result, venture capital firms and banks declined to continue financing many dot-coms. However, several—including Mondera, Blue Nile and Diamonds.com—did survive.

When Blue Nile, headquartered in Seattle, Washington, went public on the NASDAQ stock exchange in May 2004, the company reported a nearly 10-fold increase in sales from its first year in business ($14 million in 1999) to $128.9 million in 2003. In a *USA Today* profile (Acohido, 2003), founder Mark Vadon said Blue Nile's growth rested in selling diamonds with as low a margin as possible, marketing to men, and providing consumer education to make the buyer feel comfortable. Blue Nile claims to offer prices between 20% and 40% lower than chain stores, depending on the product (Rapaport, 2004a).

Amazon, the on-line book and music seller, established a jewelry site oriented toward diamonds in 2004. Founder and CEO Jeffrey Bezos said that Amazon would apply the same strategy to jewelry as it used for other categories: to deeply discount products, drive volume, and provide a wide selection (Bezos, 2004).

Online jewelry sales have grown strongly because the business takes advantage of the Internet's initial promise—less overhead, lower prices, and larger selection. The average gross profit margin for online jewelers in 2003 was 23% compared to more than 45% for store-based retailers (Wingfield, 2004). That same year, retailing consultant comScore Networks estimated consumers spent between $800 million and $1 billion on jewelry products online (Rapaport, 2004a). The on-line auction site, eBay Inc., reported that sellers auctioned $1.7 billion worth of watches and jewelry in 2004. A survey conducted by investment firm Goldman Sachs noted that on-line jewelry sales totaled nearly $2 billion during 2004 and showed the highest sales growth, 113%, of any retail category. For diamond jewelry specifically, one analyst claimed that the Internet represented approximately 2% of total U.S. sales by 2004 (K. Gassman, pers. comm., 2005).

The growing number of diamond dealers and wholesalers who began selling direct to the public via the Internet prompted complaints from retailers that the competition forced a decline in their profit margins for diamonds (Gomelsky, 2004b). One high-end jeweler who had resisted discounts said he finally relented in the wake of intense competition from the Internet (M. Moeller, pers. comm., 2005). Figures from the 2004 Jewelers of America *Cost of Doing Business Survey* bear him out: The average retailer's gross margin on loose diamonds declined 6.5% (to 39.7%) in 2003.

Auction Houses Provide New Retail Competition. During the 1990s, the media drawing power and access to top gem dealers enjoyed by the major auction houses resulted in their becoming important outlets for diamonds and diamond jewelry. By 1996, the combined jewelry sales for Christie's and Sotheby's, who together held a 95% share of the world auction jewelry market, totaled $500 million (Shor et al., 1997). This represented a five-fold increase over 1986.

The explosive growth of auction sales can be traced back to the decisions by both houses in the late 1980s to branch out from estates and sell newly manufactured goods. By the mid-1990s, one-third of auction offerings, including a majority of large diamonds and major diamond jewelry pieces, were consigned by dealers and manufacturers (Shor et al., 1997), and approximately half their buyers were now private clients, not dealers. Auction house executives and dealers saw, in the words of one, "more 50-carat-plus diamonds changing hands in the past half-decade than all [the years] since Tavernier began cataloguing them in the late 17th century" (Shor, 1998b, p. 42).

There were several reasons for this sudden influx of very large diamonds (figure 18). First, De Beers and other mining companies refined their ore-pro-

Figure 18. A number of very large diamonds appeared on the marketplace, many at auction, during the mid-1990s. This 100.2 ct emerald cut is near colorless (I) and internally flawless. Courtesy of The Steinmetz Group; photo by Harold & Erica Van Pelt.

BOX A: COLORED DIAMONDS

Colored diamonds remained largely unknown to most consumers until the 1980s (King, 2003). The publicity surrounding a number of colored diamonds sold at auction (e.g., the Hancock Red in 1987) and, in the early 1990s, Argyle Diamonds' multi-million-dollar advertising campaign for "champagne" and "cognac" diamonds created a growing consumer awareness of these goods.

The goal of Argyle's promotions was to build demand—and prices—for brown diamonds, virtually unknown to consumers at the time. The mine also produced approximately 30,000 to 40,000 carats of predominantly melee-size pink diamonds each year (Even-Zohar, 2002), making it the first consistent source of pink diamonds in the marketplace. Beginning in 1985, every year or so the company selected approximately 50 carats of the highest qualities generally larger than 0.3 ct, quite often colored a distinctive strong purplish pink, for a well-publicized tender sale in Geneva. Not only have these tender sales netted several million dollars in revenue (the company does not officially disclose totals for these sales; Shigley et al., 2001), but they also have generated considerable publicity for colored diamonds (King, 2003).

While the campaign for brown diamonds was aimed at the American mass market, the presence of yellows, blues, and pinks in most major jewelry auctions helped create demand for these colors among Asian buyers (King, 2003). The increased trade in, and awareness of, colored diamonds prompted GIA to update its colored diamond grading system, announced in 1994, subdividing the higher end of the quality ranges into new categories.

Innovations in diamond cutting during the 1970s and 1980s helped maximize face-up color appearance. One effect of these developments allowed "cape" diamonds near the "Z" end of GIA's D-to-Z color scale to be polished into attractive diamonds with noticeable face-up color, frequently placing them in the fancy range. The Radiant cut, patented in 1977, was adapted to yellow diamonds because it emphasized face-up color, allowing manufacturers to improve the color grades of diamonds that appeared light yellow in traditional cuts (King, et al., 2005).

Demand and prices for all types of colored diamonds fell sharply in the late 1990s following the Asian economic collapse, and the number of important colored diamonds offered at auction plummeted. By 2002, however, as the Asian market rebounded, demand for colored diamonds, yellows and pinks in particular, was up again, fueled by celebrities such as Jennifer Lopez and Whoopie Goldberg and the "bling-bling" (large, costly jewelry worn by celebrities) fad. Colored diamonds had finally become ingrained in the consumer consciousness (King, 2003; figure A-1). One key indicator is that requests for natural-color colored diamond grading services at GIA increased 68% between 1998 and 2003. This popularity led a group of prominent manufacturers to form the Natural Colored Diamond Association in 2004. The group helped feature natural-color colored diamonds in various fashion shows and at the 2004 Academy Awards (NCDia, 2004).

Figure A-1. Before the late 1980s, colored diamonds were viewed as little more than rare curiosities—such as the Hope diamond—by most consumers. Since then, increased availability and greater popularity among celebrities have helped colored diamonds become an important segment of the market. This collection of dramatic pink and yellow diamond jewelry illustrates some of the design possibilities these gems provide. The center stones in the rings are 0.41 ct (pink) and 0.22 ct (yellow); the eternity band is set with 13 Carré-cut yellow (2.73 ct) and 143 pink (1.15) diamonds. Courtesy of Alan Friedman Co.; photo © Harold & Erica Van Pelt and GIA.

cessing equipment to reduce the possibility of crushing these large stones (Shor, 1997a). Second, soaring auction prices prompted the administrators of Russia's Gokhran to sell a number of the 10-plus ct rough diamonds that had previously been prohibited from export (Shor, 1998b).

However, the boom in very large diamonds ended in 1997. The small coterie of dealers who purchased million-dollar-plus stones balked at prices that had risen 40–50% in only a few years. For example, a 101 ct D-flawless heart shape offered at Christie's that year failed to bring its reserve of approximately $12 million. In addition, many Asian buyers stopped participating after the economies of their countries began declining. Auction executives claimed the market, very limited to begin with, had become saturated (Shor, 1997a). The houses soon shifted their emphasis to signed jewelry, pieces from Cartier, Harry Winston, and Van Cleef & Arpels, in particular. Nevertheless, 49 diamonds over 50 ct—35 colorless, 14 colored—were sold at Christie's and Sotheby's auctions between 1990 and 2004 (F. Curiel, pers. comm., 2004).

Combined jewelry sales by the two dominant auction houses remained fairly constant at about $375 million yearly between 2000 and 2004 (F. Curiel, pers. comm., 2005). The increasing numbers of fine colored diamonds helped reinvigorate the market over the last few years (Box A).

TREATMENTS

The use of various methods to enhance the color and/or clarity of colorless to near-colorless diamonds is one of the most important developments of the last 15 years. Until the late 1980s, there were virtually no significant treatments for near-colorless diamonds. The 1990s and beyond brought new, highly controversial diamond treatments—some of which, unlike most earlier gem enhancements, presented considerable identification challenges for gemologists. The filling of fractures in diamonds with a lead-based glass to improve the apparent clarity had been introduced in the late 1980s (see, e.g., Koivula et al., 1989). Because retailers were not accustomed to checking diamonds for treatment, many of these filled stones entered the marketplace without disclosure, with tragic results in at least one case (see, e.g., Overton, 2004b). Yet fracture filling was, and continues to be, readily identifiable with magnification.

In the 1990s, a significant controversy developed around an older treatment: laser drilling to remove dark inclusions. When the Federal Trade Commission adopted its revised Guides for the Jewelry Industry in 1996, it did not require disclosure of laser drilling. The Diamond Manufacturers and Importers Association (DMIA), a New York trade organization, argued that the process did not require disclosure because "it is irreversible, does not add a foreign substance, [and] is readily detectable with a loupe" (Shor, 1996b). The organization also noted that the GIA Gem Trade Laboratory, which does not grade diamonds infused with a foreign substance, will grade lasered diamonds (with a notation of the treatment on the report).

The FTC came down on the side of the diamond industry and ruled that permanent, irreversible treatments such as laser drilling did not have to be disclosed to the consumer. This prompted protests from a number of retailer and consumer organizations. Immediately after the ruling, the DMIA reversed its position, fearing a consumer backlash, and lobbied forcefully for a change in the Guides ("FTC…," 1997). The industry, through the World Federation of Diamond Bourses and the International Diamond Manufacturers Association, then adopted a disclosure requirement.

The issue of disclosure of permanent, nonreversible treatments surfaced even more strongly in 1999, when LKI subsidiary Pegasus Overseas Ltd. and General Electric Co. jointly announced they would be marketing diamonds whose color had been enhanced by a high pressure/high temperature (HPHT) process (figure 19) that would "be

Figure 19. Processing of diamonds with high pressure and high temperature can produce significant changes in color appearance, as with this 0.61 ct pear shape (Fancy Light brown before processing, left; D-color after, right). The introduction of such treatment methods in the late 1990s created heated controversy in the diamond industry. Composite photo by Phillip Hitz, courtesy of the Gübelin Gem Lab.

indistinguishable" from natural-color diamonds by standard gem-testing techniques (see, e.g., Moses et al., 1999). The announcement touched off waves of protests. A survey by the *Rapaport Diamond Report* asked the question, "If you have an undetectable treatment, is there an obligation to disclose this treatment to the wholesaler, supplier, retailer, and consumer?" Of 323 responses, 280 answered "yes" ("Burning up the wires," 1999).

GIA president William E. Boyajian echoed the prevailing industry sentiment: "If diamonds are treated in any way, then the trade has a right to know—and ultimately so does the consumer. The integrity of the industry is at stake" ("Confidentiality agreement…," 1999, p. 21). De Beers added to the controversy when Gary Ralfe announced at the WFDB Presidents Meeting in Moscow that year that the company had known about the potential for such a treatment for more than 20 years, and had consequently kept type IIa diamonds (the type potentially treatable to colorless/near-colorless by HPHT) out of its sightboxes. After the nature of the process was revealed, a number of other treaters—not all of whom disclosed their activities—began producing both colorless and colored diamonds by HPHT processes. The diamond grading labs, including GIA, noted that they could identify the vast majority of treated diamonds (GIA Gem Trade Laboratory, 2003), but some stones remained a challenge.

SYNTHETICS

Although Sumitomo Corp. of Japan introduced jewelry-sized gem-quality synthetic diamonds in the mid-1980s, the company focused their efforts on industrial applications. Gem-quality synthetics were also produced, on an experimental basis, by both De Beers and facilities in the former Soviet Union. However, no producer offered synthetics on a commercial scale until 2003, when Gemesis Corp. of Sarasota, Florida, announced that it would market a line of yellow synthetic diamonds created by the HPHT process, using a refinement of Russian technology. Gemesis targeted retailers, marketing its product at various international trade shows. After an aborted effort in the early 1990s, Chatham Created Gems re-entered the synthetic diamond market in 2004 with a new supplier (Shigley et al., 2004; figure 20). Both organizations are currently partnering with jewelry designers to offer finished jewelry as well as loose gems.

Also in 2003, the Apollo Diamond Corp. of Boston, Massachusetts, announced it had achieved a breakthrough in chemical vapor deposition (CVD) technology that allowed the growth of jewelry-size single-crystal colorless synthetic diamonds (Wang et al., 2003). To date, however, Apollo has not released its CVD product into the gem market.

A potentially more significant source of CVD synthetics emerged from research announced in mid-2005 by the Carnegie Institute in Washington, DC, which claimed it could grow 10 ct, half-inch-thick synthetic diamonds at a rate of 100 micrometers per hour—five times faster than commercial products made using high pressure and high temperature—that did not need HPHT treatment to improve their color, as was the case with most other CVD-grown synthetic diamonds (Hemley, 2005).

Gemesis' marketing plan stirred controversy over its use of the term *cultured* diamonds in place of *synthetic*. Jewelers Vigilance Committee (JVC) executive director Cecilia Gardner said the JVC viewed the term as "insufficient" disclosure (Robinson, 2004). In Europe, a Munich court issued a restraining order against the use of the term by Gemesis' German distributor in 2004. The court ruled that the company could use only two words to describe synthetic diamonds: *synthetic* or *artificial*.

Although colorless synthetic diamonds have received a great deal of press, as of this writing there have been no reports of any commercial production, and the output of fashionable colored synthetics remains fairly small. In addition, all known synthetic diamonds are detectable with the proper gemological tests and equipment (Shigley, 2005). The DTC, however, is looking to the possibility that synthetic diamonds may become a competitive threat in the future by refocusing part of its advertising to stress the beauty and rarity of natural diamonds.

THE BRANDING REVOLUTION AND SUPPLIER OF CHOICE

The Branding Revolution. Unlike the majority of products sold at retail, diamond jewelry traditionally was branded by the retailer: Harry Winston, Tiffany & Co., Cartier, and the thousands of "main street" jewelers whose reputation backed the quality of their products. Yet this was not the case for loose diamonds, especially the standard round brilliant.

Although several firms had specialized in so-called ideal-cut diamonds, it was not until the late

Figure 20. After decades of experimental production, gem-quality synthetic diamonds finally reached commercial viability in the early 2000s. Though long a source of concern to the industry, all can be identified by a well-equipped gemological laboratory. The yellow synthetic diamond in the ring is 0.92 ct; the pink synthetic diamonds in the other ring are 0.38 and 0.40 ct; while the bracelet contains 7.48 ct of yellow synthetic diamonds (apparent sizes vary in this composite photo). Courtesy of Chatham Created Gems.

1990s that significant attempts were made to develop distinctive diamond brands around premium cuts, as manufacturers and retailers alike sought to differentiate themselves in the marketplace. One company, Hearts on Fire, developed a large marketing infrastructure to train retailers and sales associates to demonstrate the claimed differences in appearance between their premium-cut diamonds and commercially cut stones (Shor, 2002). At the same time, a number of diamond manufacturers, as noted above, sought to create brands from newly created fancy or modified brilliant diamond cuts.

In 1998, De Beers brought the branding issue to the forefront when it announced it would develop, in conjunction with sightholders, a special Millennium Diamond campaign, using a proprietary technique to apply a microscopic message to the table of each diamond. Participating retailers would show customers the message via specially purchased viewing devices. The program was designed with a two-fold purpose: to promote diamond jewelry to mark an historic milestone, and to distinguish diamonds marketed via De Beers's clients from those of other suppliers.

While the Millennium Diamond program was geared to a specific event, De Beers's executives prepared a much more sweeping initiative in 2000 that would tie branding to vast changes in the diamond distribution system by promoting strategic partnerships between retailers and diamond manufacturers as well as extensive marketing efforts.

De Beers's Strategic Review and Supplier of Choice. The advent of significant competition from other producers, a growing rough diamond stockpile, declining market share, and underperformance of diamonds as a luxury item compared to other products, prompted the executives of De Beers to initiate a total review of its operations in 1999. With Argyle's break from De Beers, Alrosa's growing independence, and the company's failure to win a majority control of Canada's Ekati production, De Beers executives realized they had to recast their operation to adapt to a multi-channel distribution system. This included: reconfiguring the company's diamond advertising to favor its own clients (rather than benefiting other producers); ensuring the integrity of its supply chain to keep out undisclosed treated and synthetic material and conflict diamonds; and ending its "custodial" role, which ultimately had benefited its competitors as much as its clients.

De Beers hired an American management consulting firm, Bain & Co., to review its entire operation and develop a strategic plan to respond to the changes taking place in the diamond world. In 2000, De Beers announced it would implement a new marketing system: "Supplier of Choice" (SOC). Company executives envisioned a diamond market with a "multitude of competing brands" that would serve to drive up consumer demand for the entire sector (Diamond Trading Company, 2000). SOC also included a set of Best Practice Principles, which bound clients to handle only diamonds obtained from legitimate sources, to

maintain safe work environments, and to strictly disclose all treatments.

The DTC then announced that it would revise its client list on the basis of "objective criteria," which would include clients' participation in downstream marketing activities, their ability to "add value" to the diamond distribution process, the efficiency of their distribution practices, and their adherence to Best Practice Principles.

SOC brought one immediate change in the way the CSO/DTC had marketed its rough to clients. Instead of supplying goods on the basis of client requests for each sight (which were often in excess of their needs), clients now worked with a DTC liaison to determine their requirements, based closely on their actual sales volumes, for a six-month period. Where possible, the DTC would schedule these allocations, called Intentions to Offer (ITO), for that period.

The DTC asked the European Commission to review its SOC initiatives, promising to make any necessary changes. There were two objectives to this move: (1) to forestall criticism and possible legal action from those whose businesses might be affected by SOC, and (2) to provide a legal precedent that would help remove the anti-trust sanctions that had barred the company from operating in the U.S. since 1944.

After requiring some modifications, the EC granted its approval to SOC in late December 2002. On June 1 of the following year, the DTC announced its new client list, pared by one-third to 84 companies. A number of those dropped included some of the best-known operations in the industry. The announcement brought sharp criticism from executives of diamond bourses in Antwerp and Israel, which lost numerous sightholders, as well as from the WFDB, which represents primarily smaller dealers. The latter enacted a resolution in 2003, stating that SOC had created a situation in which "the rough market has become concentrated in fewer hands, seriously threatening the business structure of the established wholesale diamond sector" (Katz, 2003).

Three companies dropped from the DTC's client list—IDH Diamonds NV and A. Spira, both of Antwerp, and W. B. David & Co. Inc. of New York—each separately filed suit against the DTC. Gareth Penny, DTC executive director of sales and marketing, defended the trading company's actions, saying that cuts were concentrated among those dealing in the larger sizes and higher qualities because, given the DTC's decline in market share, it could no longer provide adequate supplies of such goods (Shor, 2004). In response to the torrent of criticism over its cuts in client rolls, Gareth Penny announced that the DTC would supply $500 million of rough diamonds to non-sightholder diamond manufacturers through its subsidiary, Diamdel (Katz, 2004a).

In June 2005, the DTC announced it would add 11 new clients beginning in January 2006 and review its client rolls every 30 months thereafter. Nevertheless, the following month, the Belgian Association of Dealers, Importers, Exporters of Polished Diamonds filed a complaint with the EC alleging that the DTC had abused its dominant position and artificially limited the availability of diamonds in the market (Belgian Association..., 2005).

De Beers's Retail Venture. De Beers also underwent two other dramatic changes. Early in 2001, the company announced it would "unlock" the brand value of the De Beers name in a joint retail venture with the French luxury firm Moet Hennessy Louis Vuitton (LVMH). It changed the name of Debid, its industrial diamond division, to Element Six, and reserved the De Beers name, outside its home in South Africa, for the retail venture.

The company opened its first retail store on London's New Bond Street, amid a row of other top luxury jewelers, in December 2002. The following September, De Beers LV opened three boutiques in Tokyo, set inside major department stores. On the eve of the opening of its New York store in June 2005, De Beers LV indicated plans to have 20 stores in the U.S. within five years, and eventually 150 retail operations worldwide (Robinson, 2005b).

Industry criticism of the De Beers retail venture flared up after the announcement of the new sightholder list. Because most of the cuts were concentrated among clients who handled larger diamonds, some accused the firm of manipulating supplies to further its own retail ventures (Even-Zohar, 2003).

Privatization of De Beers. The second major change was De Beers's announcement in 2001 that it would convert from a publicly traded corporation to a private company. When the transaction was finished in June of that year, the ownership of the firm rested with three groups: The Oppenheimer family investment firm Central Holdings Ltd. and Anglo American Group., each with 45%, and Debswana,

the 50-50 joint venture with the government of Botswana, with the remaining 10%. Most of the $18.7 billion deal was financed by sales of Anglo-American stock and other assets; $3.35 billion of the transaction came from loans.

The conversion of De Beers into a private company turned the firm, in the short term, from one with ready cash reserves to one carrying a multi-billion-dollar debt. De Beers made a series of internal cuts and continued selling its stockpile, so that by mid-2004 the company had reduced debt to $1.76 billion and its stocks to less than $1 billion—nearly working levels. However, the huge expense involved in the privatization reduced the company's ability to influence prices (by withholding stocks) and national policies (such as with the $1 billion loan to the Soviets in 1991).

De Beers's executives also moved to resolve a decade-old charge that it had conspired with General Electric Co. to fix prices of industrial synthetic diamonds. A federal court had dismissed the charges against GE, but since De Beers never answered the indictment, the charges against it remained active. In July 2004, the company pleaded guilty to an unanswered price-fixing charge and paid a $10 million fine. This was the first step of a strategy to remove the legal barriers that have prevented the firm from operating directly in the U.S.

Other Strategic Partners. Outside of the DTC's purview, a number of vertical-integration deals have occurred between producers seeking stable, reliable outlets for their diamonds and retailers desiring a reliable source of supply. The case of Aber Resources and Tiffany & Co. offers an interesting example.

During the long development period of Canada's Diavik mine, Tiffany & Co. acquired a 25% stake in the mine's junior partner, Aber Resources. The transaction would provide the retailer with direct access to Diavik's production at advantageous prices when the mine came on stream. However, in March 2004, Aber Resources itself acquired a controlling interest in Harry Winston Co. Aber president Robert Gannicott explained his rationale for acquiring Winston: Next to mining, retailing was the most profitable segment of the diamond business. In addition, the stake in Winston would allow the company to remain in business after the mine closed (Gannicott, 2004).

Tiffany ended its equity relationship with Aber in the fall of that year, though the mining company continues to supply it with $50 million of rough diamonds yearly. Tiffany then moved to further assure its diamond supplies by signing a memorandum of understanding with a smaller Canadian producer, Tahera Diamonds, to buy the entire three-million-carat diamond production anticipated over its projected nine-year life. Tahera is developing the Jericho mine in Nunavut, which is projected to begin production in 2006.

Although the concept of retailers having direct access to mine production or a DTC sight is not a new one (Zale Corp. was a sightholder in the 1970s and 1980s), the number of these alliances, tied as they are to the luxury market where the greatest scarcities lie, could result in diminished supplies of such diamonds reaching the open market, extending the competitive reach and domination of the industry's largest players.

THE RISE OF INDIA IN MANUFACTURING

When the DTC announced its new, greatly reduced client list in 2003, India's industry actually had a net gain of five sightholders, while the other three "traditional" centers lost a third or more of theirs (*Diamond Trading Company Sightholders*, 2004). This event, perhaps more than any other, demonstrated how the balance of the world's diamond manufacturing industry had shifted to that country (see also table 2 and figure 21).

TABLE 2. Share of DTC rough diamond sales direct to India, 1990–2004 (in millions of US$).[a]

Year	Total DTC sales	India's share	% of DTC sales
1990	4,167	638	15
1991	3,927	678	17
1992	3,417	566	17
1993	4,366	706	16
1994	4,250	690	16
1995	4,531	747	16
1996	4,834	677	14
1997	4,640	618	13
1998	3,345	483	14
1999	5,240	777	15
2000	5,670	995	18
2001	4,454	989	22
2002	5,154	1,127	22
2003	5,518	1,469	27
2004	5,695	1,608	28

[a] *Source: "DTC sale..." (2005). Note that this chart does not include the substantial amounts of DTC rough that are transshipped through Antwerp.*

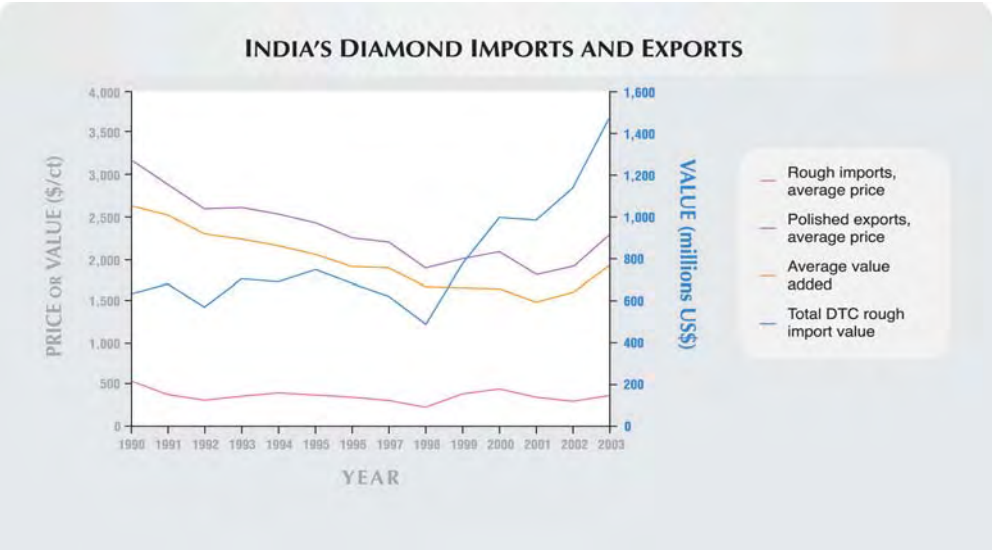

Figure 21. Though the average per-carat value of rough imported to India remained relatively constant from 1990 to 2003, the per-carat value of polished exports fell during much of this period—until the advent of De Beers's Supplier of Choice program in 2000–01, when the value of DTC rough imports rose sharply. (Sources: "Average price…," 2005; "DTC sale…," 2005.)

While Antwerp remains an important trading hub for rough diamonds (45% of the DTC's sales passed through the city in 2002; Even-Zohar, 2002), its role as a diamond manufacturing center has diminished sharply. An estimated 2,000 workers are currently employed full-time there in diamond manufacturing, compared to approximately 8,500 in 1984 (Shor, 1984) and 19,000 in 1968 (Even-Zohar, 2002). Manufacturing in Israel has seen similar declines, from a 1970s peak of approximately 13,000 to less than 4,000 in 2002. In both cases, rising labor costs in the face of increasing retail price competition were a key factor, with the implementation of highly automated manufacturing operations further contributing to workforce reductions in Israel (Caspi, 1997).

With a million or more diamond workers, India has become the overwhelmingly dominant force in diamond manufacturing (figure 22). India's trade organization, the Gem and Jewellery Export Promotion Council, reported early in 2004 that 92% of all diamonds in the market were manufactured in India; this is up from 60% in 1990 (Sevdermish et al., 1998). This represented 60% by value, up from 33% in 1990.

The extraordinary growth of India's diamond industry was achieved by capitalizing on a number of events:

- The huge production from the Argyle mine, much of which could not have been cut profitably in any other center
- Increased demand from U.S. mass marketers for affordably priced diamond jewelry
- Sales of large amounts of Russian "technical" goods from the Kremlin stockpile
- Greater direct access to the American consumer market
- New technology that permitted processing of diamonds much more efficiently and quickly, and with much greater precision

In the early 1990s, many of India's second-generation diamond manufacturing executives began looking beyond the niche of small, lower-quality diamonds on which their industry was originally built. They focused on two areas: finished jewelry and larger, better-quality loose diamonds. Finished jewelry, they believed, would bring higher profit margins than loose goods that were easily price-shopped.

Through its Indo-Argyle Diamond Council, Argyle provided a direct conduit to the lucrative American finished jewelry market. The Council's U.S. marketing consultants, MVI, worked with mass marketers and large retail jewelry chains to determine their needs regarding quality and service. The Council then embarked on a stringent program to bring Indian jewelry manufacturers up to world standards regarding working conditions, employment (including age), and quality of product. De Beers also adopted labor and working-condition standards into its Best Practice Principles, and Argyle adopted them into its Business Excellence Model.

By 2004, the 10th anniversary of Indo-Argyle's founding, top retailers including J.C. Penney, Signet

Group, Zale Corp., and Wal-Mart had established permanent buying offices in Mumbai through the Council's efforts. Beyond Indo-Argyle, Indian firms have established an international presence through De Beers's SOC, including a number of strategic partnerships with U.S. and European companies (Weldon, 2004b).

India's younger generation of diamond manufacturers also saw diamond-processing technology as a means of taking their industry to a higher level in terms of quality and speed of production (S. Doshi, pers. comm., 2004). American and Asian retailers demanded that even "stars" (50 per carat or smaller) be well made and show "life." In the early 1990s, India's production of Argyle goods greatly accelerated following the introduction of a new type of scaife that was impregnated by diamond powder. Argyle material was considered very difficult to work because the crystals were usually distorted and brittle, requiring diamond polishers to constantly monitor every stone and shift the polishing angle in tandem with the grain. Failure to do this often resulted in broken or "burned" diamonds. The diamond-impregnated scaife not only eliminated the need to constantly turn diamonds on the wheel, but it also allowed manufacturers to automate the polishing process.

The maturity of India's diamond-manufacturing industry coincided with the rapid growth of that country's middle class, who have become prolific diamond consumers in their own right. The combination of India's dominance in manufacturing with growing domestic consumer demand has transformed the country into a force that can affect and influence how the industry in the rest of the world does business.

Figure 22. Over the past three decades, the center of the diamond-polishing industry has shifted east from Europe and Israel to India. Due in part to low labor costs and a large, well-educated workforce, India has become the world's leader in diamond manufacturing. Over 90% of the diamonds on the market are now cut in India. Shown here is the KARP factory in Jasdan, Gujarat. Photo © H. Goldie & Company.

FUTURE OPPORTUNITIES AND CHALLENGES

The DTC's stated policy of pushing more marketing initiatives to build demand and the luxury image of diamonds will undoubtedly continue to affect the diamond market. Although new mine production will likely meet rising consumer demand in the long run, shortages of rough diamonds in certain size and quality categories will remain for some time. Rough and polished prices may become more volatile because the DTC, Alrosa, Rio Tinto, Debswana, and Namdeb have sold most of their buffer stocks, reducing their ability to mitigate supply shortages and influence prices. In addition, competition between producers will make price regulation more difficult (Pearson, 2004).

Supplies of small diamonds, the mainstay of U.S. mass merchandisers, may be greatly reduced if Rio Tinto decides not to redevelop Argyle into an underground mine. While new diamond sources are being developed, principally in Canada, they do not promise the vast yields of smaller goods that Argyle currently produces.

The desires of diamond-producing nations to increase revenue and employment by localizing diamond manufacturing operations will likely raise manufacturing costs, because the majority of these nations have a much higher wage structure than India, while they will accelerate employment decline in higher-wage cutting centers such as Antwerp and Israel.

The balance of the industry will continue to tip toward Asia because much of the growth in consumer demand will likely come from two emerging markets, India and China. Sales of diamond jewelry in the former increased almost three-fold from 1995 to 2003, to Rs 55.968 billion ($1.287 billion). China has experienced similar growth (Kendall, 2004). The DTC has instituted major consumer advertising programs in both countries to tap into the rapidly improving purchasing power of the middle classes. Growing consumer demand

Figure 23. Despite dramatic changes in the diamond industry, fine diamond jewelry remains an important element of modern fashion, with an ever-increasing array of choices for designers and consumers. Yellow diamond (1.99 ct) ring courtesy of Kathryn Kimmel, GIA; brooch courtesy of Fortunoff; Infinity bracelet by Pascal LaCroix; other items from the GIA Collection. Photo © Harold & Erica Van Pelt and GIA.

in new markets, coupled with increasing sales in mature markets such as the U.S., will continue to keep rough diamond supplies a significant issue (Mehta, 2003).

Although diamond demand has grown rapidly in India and China, these areas still comprise a relatively small share of sales as compared to established consumer nations like the U.S., Japan, and Western Europe. The DTC has noted moderate dollar-value sales growth in these markets, although real increases were much lower when measured against rising polished prices—particularly in carat-plus goods. Indeed, some analysts believe such increases are more the result of DTC price hikes than greater demand (K. Gassman, pers. comm., 2005).

Banks have assumed a much more active role in the diamond industry in recent years, because industry credit requirements more than doubled—from $3.9 to $8.6 billion—between 1995 and 2003, while profit margins have been shrinking, payment cycles have lengthened, and polished inventories of some qualities have been mounting. Banks have expressed concern over rising debt levels and, while stressing their ongoing commitments to the diamond industry, have assumed increasing veto power over deals with retailers or manufacturers who carry excessive memo or payment terms, such as one year (Gross, 2003). All indications are that banks will continue to grow stricter with the diamond industry, while retailers continue to push for increasingly generous terms.

Corporate governance issues will become more ingrained into industry practice through initiatives launched at the close of 2004 and early in 2005. The so-called Early Adopters' Initiative, which developed into the London-based Council for Responsible Jewellery Practices, began in November 2004. Participants in this effort—many of the industry's leading businesses and trade organizations—seek to promulgate a unified code of business practices regarding adherence to the Kimberley Process and PATRIOT Act provisions, fair labor practices, and full disclosure of treatments and synthetics at all distribution levels. In January 2005, De Beers, together with NGOs Global Witness and Partnership Africa Canada, the World Bank, and various governments, launched the Diamond Development Initiative, designed to integrate the diamond production of African *garimpeiros* into the "formal" mining sector. Currently, the Kimberley Process does not take into account the production of the estimated one million diggers in countries such as Angola, the Democratic Republic of the Congo, and Sierra Leone. The conveners of the initiative believe that bringing this production into the formal mining sector, with Kimberley Process accountability, would reap major benefits for the miners, governments, and the diamond industry (O'Ferrall, 2005).

CONCLUSION

The last 15 years have brought changes to the diamond industry that have affected every part of the pipeline, from mine to retail. As new diamond sources opened up, De Beers's single-channel marketing system, in place since the 1930s, gave way to a multi-channel environment. This required that the company transform itself into a more marketing-driven business. It also ended its traditional role

of market custodian as it sold its buffer stock of rough diamonds, which profoundly affected diamond manufacturers and dealers downstream. The Supplier of Choice initiative alone represents one of the most sweeping changes in the diamond industry in the past half century.

Civil wars in several producing nations forced the diamond industry to account for the legal legitimacy of the goods it sells, while governments anxious to cut off terrorist financing and money laundering subjected the industry to unprecedented scrutiny. Now, governments of producing nations are placing greater pressure on De Beers and other mining companies to establish "beneficiation" projects to increase local ownership, employment, and revenues.

Jewelry retailers saw new competition, first from auctions, which became a major sales outlet for the extreme top end of the market, and then from the Internet, which also brought consumers access to a great deal of gemological and market information about diamonds. New diamond cuts and branded diamonds provided an array of new choices for consumers and business opportunities for diamond firms (figure 23), while colored diamonds took center stage in the celebrity fashion world. Gemologists and dealers at all levels were faced with new treatments and the commercial availability of jewelry-quality synthetic diamonds.

The political and structural changes in diamond distribution will likely cause continued realignments within the diamond-manufacturing and trading centers, with resulting pressures on supplies and profits. Through all these changes, sales of diamond jewelry have continued to grow strongly worldwide, promising lucrative opportunities to dealers and retailers with the market knowledge and gemological know-how to take advantage of them.

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