

# PROBLEMS OF THE CREATION OF TERRITORIAL COMPLEXES ON THE WORLD DIAMOND MARKET

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**ABSTRACT.** The main focus of the paper is on one of the most significant issues of economic geography nowadays, namely ways of an efficient distribution of facilities on the basis of inter-industry complexity (on the example of the diamond industry). The description of the formation of the complex branch of the diamond industry is carried out in several stages: determining the cause of inter-sectoral cooperation in the diamond industry; investigating territorial features of the complex that belongs to ABA, the most important of which is the difficulty of forming the WPK national (country) level; defining a cluster as the main form of territorial complexity characteristic of ABK (its types and causes of formation, characteristics of each cluster); and drawing conclusions about the appropriate degree of territorial concentration of various activities under the ABA type of market for which they are characterised. Special attention is paid to the identification and examination of territorial complexity types in the diamond complex in Russia.

**KEY WORDS:** diamond complex, diamond market, diamond pipeline, territorial-industrial complex, cluster, Russia

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## Review of the literature on the topic

A study of a diamond complex, as any other kind of economic activity, is limited to the commercialisation of information about the functioning of particular enterprises and, consequently, to very generalised consolidated statistics reporting on the market in general, submitted to official statistics agencies. Thus, a search for any objective source of information about the state of the market and the characteristics of its development for scientific purposes presents a problem.

Therefore, in the majority of cases researchers in the field of the diamond complex deal with the information provided by leading analysts of

the largest international industry-based analytic (consulting) agencies and industry-specific journals. Being an integral part of the market, they know inside out not only the main subjects there and peculiarities of their performance, but also the mechanisms of formation and functioning as well as the market condition. In this respect, the “three pillars” of information source about the whole global diamond complex are industry-based analytic agencies: the Rapaport Group (USA), Tacy Ltd. Diamond Industry Consultants (Israel), IDEX Online (International Diamond Exchange) (Belgium), and Polishedprices (Great Britain), whose activity is guided by ideas and researches conducted by M. Rapaport and A.

Kravitz, E.Z. Chaim (Chaim 2007), K. Gassman, R. Plat, and C. Wyndham, respectively. All of them specialise in studying processes which determine the development of the world market of raw diamonds, diamonds and diamond jewellery.

Unlike the foreign practice of diamond market studies, Russian analytic agencies dealing with diamonds are more concerned with a search for, collection, translation and dissemination of the already existing research material rather than with carrying out their own studies. In this context, most interesting are the materials produced by Rough&Polished and the Mineral analytic centre.

Having said that, we would like to point out that due to the considerable involvement of the Russian national economy in the global diamond complex the Russian scientific community shows traditionally high interest in peculiarities of its operation. It should be noted that the major part of those studies are connected with several well-established fields. First, this is an examination of one of the basic issues in the diamond complex, i.e. mechanisms of price formation for the complex production (Fridman, Babat 1996), which, in turn, brings together foreign and domestic researches. Secondly, this is the study of enterprise management in the diamond complex and designing ways of improving their performance (Nikolaev, Maraktaev 2006), financing methods, state regulation, Russia's role in the world diamond complex, and national features of regional diamond complexes. Having created new economic conditions, the world economic crisis has made it necessary to study their influence on the development of particular types of activities, including the diamond complex.

Owing to the fact that Russia is characterised by considerable territorial disproportions in diamond extraction, many researchers regard the diamond industry of a particular region (the Sakha Republic, the Perm region, the Arkhangelsk region) as a potential resource on the basis of which a territorial complex can be built, including not only diamond-mining, but also diamond-cutting, jewellery and trade enterprises. Consequently, a large number of publications are concerned with both the formation and operation of regional diamond complexes in Russia and with an examination of the diverse forms of territorial property in diamond complexes, built on vertical

integration (territorial production complexes) and on horizontal one (clusters) (Skripnichenko 2000, Egorova 2007, Pototskaya 2008).

This paper attempts to make an economic-geographical analysis of the impact of territorial properties on the development of particular kinds of economic activities (industries) using the example of the diamond complex which the author specialises in.

## **Industrial complexity of the diamond market**

In the scientific geographical (Pototskaya 2008) and economic literature (Egorova 2007, Egorov 1977, Skripnichenko 2000, Fridman, Babat 1996) as well as in state documents (Kartsman 2005), rough-diamond, cutting and jewellery industries which produce the same end product, namely, diamond jewellery, are usually regarded as constituent parts of one united diamond complex (DC) (Nikolaev 2006, Pototskaya 2008) or the diamond market (DM) (Pototskaya 2005, Diamond pipeline 2014). It is determined by a very strong interdependence of the above-mentioned industries caused by the following reasons.

The first is the existence of numerous common problems, such as the fight against the so-called 'bloody diamonds', the need to work out different standards of certification for natural diamonds, man-made diamonds, natural diamonds with improved properties, etc. These problems are solved primarily with the help of industry integration (the World Federation of Diamond Bourses, the International Diamond Manufacturers Association, the World Jewellery Confederation), and the integration of industries that are directly connected with it (the World Diamond Council). The second reason is a significant price interdependence between all industries within the diamond complex. The third is the necessity to implement a consistent inter-industry marketing strategy because companies which operate on the industry markets, i.e. the rough-diamond and polished-diamond markets, can increase the demand for the goods only by promoting the end merchandise which is made of rough and polished diamonds, namely, diamond jewellery.

All those reasons dictate a vertical integration strategy to companies of the diamond complex which, in turn, can be treated as another aspect of complexity. Rough-diamond companies, as a rule, run their own cutting and jewellery facilities or establish good long-term partnerships with various companies from the related industries, for instance, Rio-Tinto – Tiffany, Aber Resources – Harry Winston, De Beers – LVMH, Leviev Group – Bulgari, Pluczenik Diamond – Escada, Rosy Blue – Nagahori Corporation, ALROSA – Diamonds ALROSA, Tiffany, etc. Thus, a vertical integration strategy of those companies not only helps them to solve common inter-industry problems efficiently, but also contributes to improving the condition of the diamond market because it allows regulating the market, first, by means of controlling the offer (through a certain price policy) and secondly, by means of manipulating the demand (through cooperative branding of the end merchandise).

All those aspects compel most researchers to regard the rough-diamond, cutting and jewellery industries together in the framework of an inter-industry complex which they call “the diamond complex” (Egorova 2007), “the rough-diamond industrial complex” (Egorov 1977), or “the rough-diamond complex” (Markaryan 1989, Skripnichenko 2000), or, using a more common generally accepted terminology, “the diamond pipeline” (Pototskaya 2005) (Fig. 1). Its scheme can be made up by placing all the industries in the order in which the manufactured goods go through them, starting with rough-diamond recovery and ending with producing diamond

end goods. Consequently, there is a following sequence: rough-diamond recovery, wholesale trade of rough diamonds, polished diamond manufacturing, wholesale polished diamond trade, diamond jewellery production, and finally wholesale and retail trade of diamond jewellery. Taking into consideration not only manufacturing, but also trading activities, scholars use another term: the “diamond market”, along with the long-established “diamond complex”.

Filling the diamond pipeline diagram with statistical data and analysing its dynamics not only enables researchers to gain an insight into the character of interaction between the various industries within the diamond complex, but also allows them to identify the level of their interdependence and, consequently, of their vulnerability. This information can be obtained by calculating the total rate of the cost increase at every stage of the diamond pipeline (the ratio of quantitative indices which reflect the state of the next stage of the pipeline to those which reflect the state of the preceding stage – Table 1) as well as the industry rate of the cost increase of every product segment of the diamond pipeline (the ratio of the cost of the produced merchandise to that of the sold one within the frameworks of the rough-diamond, cutting and jewellery industries – Table 2).

From an analytical point of view, the most informative and, consequently, the most frequently used is the industry rate of the cost increase at every product segment of the diamond pipeline. It enables researchers to determine what product segment on the market is the most or the least



Fig. 1. The diamond pipeline – 2014 (based on Diamond pipeline 2014).

Table 1. Dynamics of the distribution of the cumulative cost and the total rate of the cost increase at every stage of the diamond pipeline.

Stages of the diamond pipeline		2000	2004	2008	2012	2014
Cost price of extracted raw material	bln dollars	1	3.9	7.2	6	6.9
	total rate					
Cost of rough diamonds	bln dollars	7.5	10.1	14.3	13.4	16.52
	total rate	7.5	2.6	2	2.2	2.4
Sales of rough diamonds in places of diamond mining	bln dollars	7.8	11.3	14.2	15.5	16.7
	total rate	1	1.1	1	1.2	1
Sale of rough diamonds to processing centres	bln dollars	8.8	11.9	14.5	15.2	16.7
	total rate	1.1	1.1	1	1	1
Volume of raw material in production	bln dollars	9.6	12.1	14.2	17.6	22.3
	total rate	1.1	1	1	1.2	1.3
Polished diamond production	bln dollars	12.8	16.7	19.7	20.7	21.8
	total rate	1.3	1.4	1.4	1.2	1
Polished diamond sales	bln dollars	13.7	16.7	18.4	21.9	23.01
	total rate	1.1	1	0.9	1.1	1.1
Sales of diamond jewellery	bln dollars	57.6	60.6	64.8	72.1	78.5
	total rate	4.2	3.6	3.5	3.3	3.4

Calculated on the basis of IDEX Online News: Diamond pipeline, 2000–2014.

economically efficient, and to identify current development tendencies in each segment.

According to the calculations, from the economic point of view the most efficient segment of the diamond market is the sale of diamond jewellery (the rate of cost increase is  $k = 1.9\text{--}2.2$ ), followed by the sale of rough diamonds ( $k = 1\text{--}1.3$ ). The least economically efficient segment is the sale of polished diamonds ( $k = 0.9\text{--}1.1$ ). Apparently, the dynamics of the cost increase rate of diamond jewellery is of crucial significance to the world diamond complex, since this index reflects current tendencies in the demand for the end product, namely, for diamond jewellery, which, in turn, determines the demand for intermediate goods, such as rough and polished diamonds. Any slight change in the cost increase

rate should get immediate attention of manufacturers of all three kinds of goods and compel them to stimulate their marketing activities. A rise in this index indicates a favourable situation on the world market.

It is of pivotal importance for the most vulnerable members of the diamond complex, namely, for polished-diamond producers who are in the centre of the diamond pipeline, to take into consideration simultaneously the dynamics of the cost increase rate of sales of rough diamonds and diamond jewellery. Any coordinated harmonious development of these rates (equal growth rates) indicates stability on the world diamond market which, in turn, ensures stable development of the cutting industry as well. Discordant development of these indices can be regarded,

Table 2. Dynamics of the rate of cost increase in each product segment of the world diamond complex. Calculations based on Diamond pipeline (2014).

	2004		2008		2012		2014	
	bln \$	k	bln \$	k	bln \$	k	bln \$	k
Rough diamond mining	10.1		14.3		15.5		16.5	
Sale of rough diamonds	12.1	1.2	14.2	1	17.6	1.1	16.7	1
Production of polished diamonds	16.7		19.7		20.7		22.3	
Sale of polished diamonds	16.7	1	18.4	0.9	21.9	1.1	23	1
Production of diamond jewellery	31.7		n/u		n/u		n/u	
Sale of diamond jewellery	60.6	1.9	64.8	-	72.1	-	78.5	-

on the one hand, as an indicator of a favourable environment which enables polished-diamond manufacturers to enhance their profits (an increase in the sales rate of diamond jewellery and a decrease in the sales rate of rough diamonds) and, on the other hand, as evidence of an unfavourable market condition (an increase in the sales rate of rough diamonds and a decrease in the sales rate of diamond jewellery).

### **Territorial complexity of the diamond market**

The industrial complexity we have examined is primarily manifested at the global territorial level, but is difficult to observe at the level of a particular country (the national level). This is due to various factors which determine the distribution of facilities of every industry. Thus, the development of the rough-diamond industry is affected by such factors as the existence of natural resources, availability of funds, and proper state regulations. For the cutting industry the following factors are crucial: the cost and quality of the labour force, the availability of funds and entrepreneurial resources. The development of the jewellery industry is determined in the first place by the consumer characteristics of a region, established traditions of the production and consumption of diamond goods, as well as the cost of the labour force. It is difficult to find countries that would possess the whole range of those properties vital to the development of a diamond complex. For that very reason there are almost no territorial industrial complexes formed in the framework of a diamond complex. If any country where rough diamonds are mined strives to build all the product segments of a diamond complex, it often faces nonconformity of the product structure of extracted rough diamonds to the product structure of polished diamonds and diamond jewellery produced on its territory.

Thus, although Russia has a leading role on the world market of rough diamonds (approximately 25% of the world rough-diamond mining in monetary terms), it produces only 4% of all world diamonds and is not considered to be a leader either in polished-diamond production or polished-diamond consumption. It stems from the fact that most of the rough diamonds mined

in Russia belong to the category of technical, or 'near-jewellery', polished diamonds because their processing is most efficient economically in countries with low-cost markets, such as India, Ukraine, Armenia, etc. Whereas Russia is characterised by a substantially higher labour cost due to the qualifications of specialists as well as by a generally high price of polished-diamond production owing to raised electricity consumption and corresponding expenses (automation, mechanisation, relatively severe climate, etc.). For this reason, in Russia it is profitable to produce only polished diamonds of the highest quality and, consequently, of the most expensive category. It leads to the specialisation of the leading national companies in the so-called Russian (ideal) gem-cutting. At the same time the sale of such products on the domestic market is significantly restrained by a low consuming capacity of the population. On the other hand, the intensively developing domestic jewellery industry needs polished diamonds of a relatively cheap category which are primarily produced by India and some countries of the Commonwealth of Independent States, such as Ukraine, Armenia, etc. All this results in a situation when domestic cutting companies have to export almost all goods (more than 90%), whereas domestic jewellery companies have to import less expensive polished diamonds from other countries specialising in their production. Lack of rough diamonds of high jewellery quality, in turn, forces Russian cutting companies to look for an external source of rough material (for instance, Ghana, Guinea, the Republic of South Africa, Tanzania, etc). All the quantitative indices which reflect current problems of creating territorial-industrial complexes in the Russian diamond complex are presented in a diamond pipeline calculated by the author (Fig. 2).

It may seem that the main barrier in building territorial-industrial complexes on the Russian diamond market is its small capacity, disproportional to the volume of rough diamonds mined and polished diamonds produced. However, it is almost impossible to imagine proportionate volumes of rough-diamond mining, polished-diamond manufacturing and diamond jewellery production as well as the volume of their consumption in Russia (though it is characteristic of any country in the world). This is due to the fact

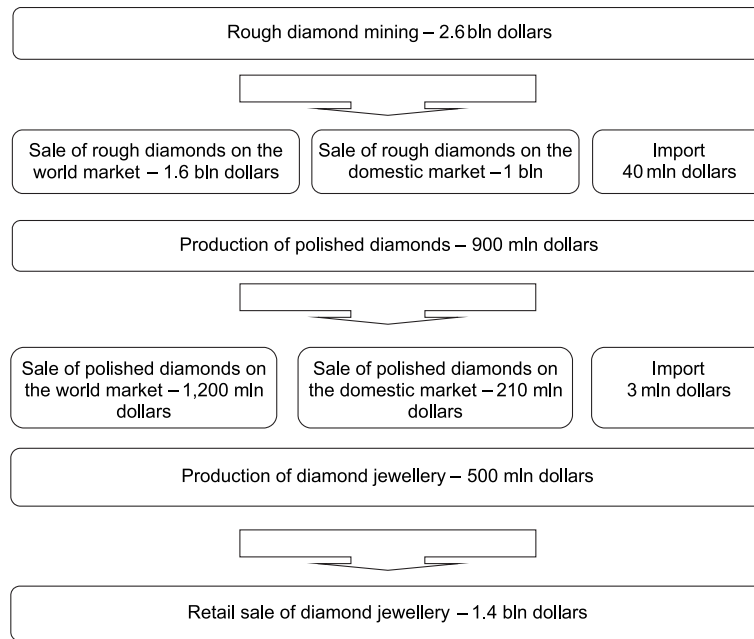


Fig. 2. The diamond pipeline in Russia in 2008 (on the basis of Pototskaya 2007).

that an improvement in the basic index, namely, of consumption properties of the market (for instance, an increase in the average personal income) is likely to lead to quite controversial consequences. On the one hand, the domestic consumption of polished diamonds and diamond jewellery will go up. However, on the other hand, the production of polished diamonds and diamond jewellery will, in turn, become unprofitable due to higher salaries and will gradually migrate to other countries. How can a territorial-industrial complex exist in such circumstances?

Having said that, at the level of some countries we can still observe certain elements of complexity which are to a larger or a smaller extent represented there even though in those countries there is this incongruity between the product structures of the studied industries. In the countries where rough diamonds are mined and which apply the policy of building territorial-industrial complexes, the cutting industry is regarded as a source of profits by producing the added value of rough diamonds after their cutting, and as a source of new working places owing to the high labour input. However, countries that have a relatively high level of socio-economic development (for instance, Canada, Russia, the Republic of South Africa) come across the problem of a high cost price and, consequently, non-profitability of the cutting industry (a lot of labour input is required). Whereas developing

countries at a low level of socio-economic development that fall behind scientific and technological progress (Tanzania, Namibia, Botswana, Angola) suffer from poor technological equipment of the cutting industry and from the lack of qualified specialists, all of which leads to the fact that the produced low-quality goods fail to compete on the world market. If a state strives to set up a jewellery industry, apart from the cutting industry, on the basis of its own rough diamonds (Russia, the Republic of South Africa), then the territorial complex which appears as a result of those efforts (if it can be considered a complex at all) can hardly be regarded efficient.

The main form of the territorial complexity on the diamond market is a cluster which can be defined as a group of facilities located on the same territory, characterised by a similar specialisation and using one and the same industry infrastructure. Depending on the specialisation of the country within the world diamond complex, we can distinguish several kinds of clusters: trade clusters which are specialised in trading rough diamonds, polished diamonds and diamond jewellery, cutting clusters and jewellery clusters (Fig. 3).

Owing to some objective reasons, the volume of secondary trade in rough diamonds and polished diamonds exceeds the volume of primary trade on the world market. That is why trade clusters are a norm on this market and why they form on the territories of countries-intermediaries.

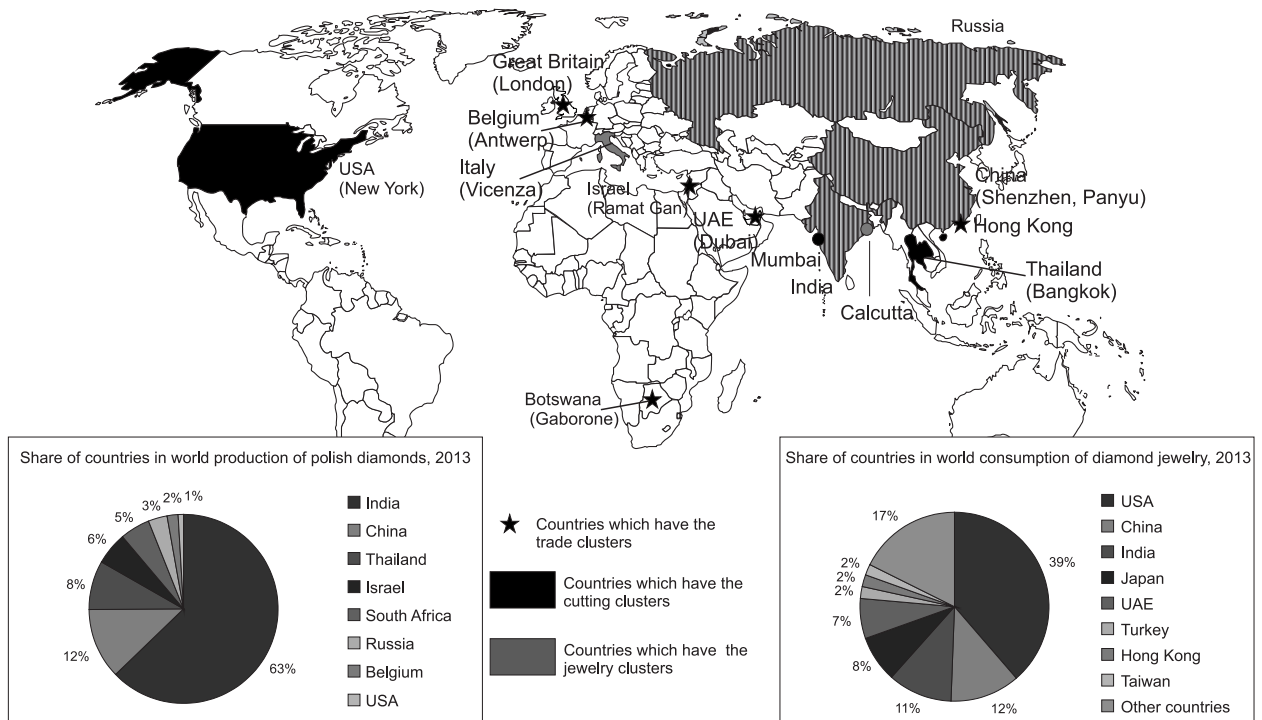


Fig. 3. Types of clusters of diamond complex (compiled by the author).

Those countries are, as a rule, characterised by a combination of the following properties: a preferential tax and legislation treatment, and the availability of highly qualified appraisers and assessors as well as gemologists. Among the main intermediaries are such countries as Belgium (24% of the world import of rough diamonds, 35% of the world secondary export of rough diamonds, 21% of the world polished diamond import, 24% of the world polished diamond export), Great Britain (22% of the world import of rough diamonds, 33% of the world secondary export of rough diamonds), Israel (17% of the world import of rough diamonds, 17% of the world secondary export of rough diamonds, 10% of the world polished diamond import, 17% of the world polished diamond export), Hong Kong (8% of the world polished diamond import), the United Arab Emirates (UAE) (5% of the world import of rough diamonds, 11% of the world secondary export of rough diamonds, 10% of the world polished diamond import and 8% of the world polished diamond export) (IDEX Online Research 2014). Trade functions are concentrated territorially within each country. Thus, in Belgium they are concentrated in Antwerp, in Great Britain – in London, in Israel – in Ramat Gan, and in the United Arab Emirates – in Dubai.

The oldest and largest trade cluster of the world diamond market is located in Belgium. All its activities are concentrated on the famous ‘diamond square mile’ (Rijfstraat, Hoveniersstraat and Schupstraat); located there are cutting facilities, diamond exchanges, specialised banks which provide the industry with loans, transport companies, diamond jewellery shops as well as educational and scientific institutions connected with the diamond business. Over 1,500 companies are concentrated in this region; they produce and trade in rough and polished diamonds. However, the high level of social and economic development hinders the implementation of intermediary functions: high incomes of the population lead to high prices of manufactured goods, which results in turn in the necessity for protectionism and the elimination of preferential taxation. Therefore, intermediary functions migrate from developed countries to developing ones where the level of protectionism is still low. This tendency causes the appearance of new intermediate centres and clusters.

The UAE can boast of their new and quickly developing trading cluster of the world diamond market. It mainly focuses its activities in Jebel Ali, a specialised park for commerce and industry in Dubai, which is also known as ‘the park of gold

and diamonds'; this centre functions in a free economic zone. More than 6,300 companies working in various industries are located there, including diamond cutting facilities, refining plants, hallmarking institutions, securities, banks, and jewellery plants. Most companies are targeted at wholesale and retail diamond trade and jewellery. The leading position in this process belongs to the Dubai diamond exchange, which trades diamonds at the international level.

It is quite obvious that the diamond-cutting clusters develop in those countries which specialise in diamond production; they include India, China, Thailand, Israel, Belgium, Russia, the USA, etc.

The largest diamond-cutting cluster is located in India (60% of the world diamonds are produced there), the largest facilities are concentrated in Surat, Bhavnagar, Ahmedabad, Palanpur (the state of Gujarat), and Mumbai (the state of Maharashtra). Those centres have their specialisations, for instance Surat and Mumbai produce high-quality diamonds, while diamonds of lower quality and smaller size and weight are produced in Bhavnagar. Diamond-cutting centres in Ahmedabad and Palanpur are famous for the use of the most complicated technological process in cutting diamonds from the Argile lamproite deposit (Australia).

The youngest and most modern diamond-cutting cluster is situated in the eastern free economic zone of China (14% of the world diamond production is concentrated there). Most diamond-cutting facilities are located in the province of Guangdong (over 30 plants produce more than 70% of all polished diamonds in the country) and in the province of Shandong (where 24 plants produce 10% of all polished diamonds in China). The plants located in Shanghai and its region also play an important role in the industry (15 plants produce 12% of polished diamonds in China which are traded on the Shanghai Diamond Exchange) and in Beijing (12 plants produce 8% of national polished diamonds).

The Thailand cutting industry actively competes with the Chinese industry, as Thailand has one of the most promising diamond-cutting clusters in the world, quickly developing due to the low cost of the highly qualified labour force. The cluster is located in the Gemopolis free economic zone in a Bangkok suburb. It embraces over

30 diamond-cutting facilities, an association of sellers of gems and jewellery, a jewellery club, a diamond exchange, the Bangkok diamond and gem exchange, the Department of export, the Gemmological Institute, etc.

Israel has the most technically advanced diamond-cutting cluster in the world (14% of world polished diamonds are produced here). It consists of a diamond exchange, an association of diamond producers, the Israeli Diamond Institute, diamond-cutting facilities (over 700), and the IDEX magazine, which is a leading publication in the diamond industry. The cluster is located in Ramat Gan, not far from Tel Aviv, and specialises in the production of small and medium-sized, high-quality polished diamonds which have a so-called 'commercial cut'.

The diamond-cutting cluster in the USA (4% of world diamonds are produced there) is concentrated in New York. It is situated in the 'diamond district' of Manhattan in 47<sup>th</sup> Street between the 5<sup>th</sup> and 6<sup>th</sup> Avenues. The cluster includes nearly 100 plants, world-famous gemmological laboratories, a diamond exchange, the New York Diamond Dealers club, and the Rapaport Diamond Report, which is an expert publication in the diamond industry.

The concentration of production in the jewellery industry is much lower than in the diamond-cutting industry. At the same time each country has areas where the concentration of diamond jewellery production is particularly high.

Italy, for instance, can boast the most famous jewellery world clusters, which take a leading position in the jewellery fashion industry. The most important centres are located in the north of the country: the provinces of Veneta (Vicenza, Venice), Toscana (Florence, Arezzo, Siena), Piemont (Valenza), and Lombardia (Milano). There is also a distinct labour division among the above-mentioned cities: Valenza is famous for diamond and gem jewellery production, Vicenza makes moderately priced diamond jewellery, while Milano, Florence and Arezzo are known for their gold jewellery.

Jewellery production in India (12% of the world diamond jewellery is produced there) is distributed throughout the country, which implies the absence of any clustering. However, most jewellery companies are concentrated within one state of Western Bengal (Calcutta):



it accounts for 60% of private jewellery producers and specialists, hence there are the necessary grounds for considering it a cluster.

China produces 11% of diamond jewellery in the world, the leading position belonging to the province of Guangdong (Shenzhen, Penjou, Shantou), which has over 700 plants; consequently, this factor serves as a prerequisite for defining it as a diamond-cutting cluster.

**Russian clusters** can be put into two main groups: diamond cutting and jewellery production. The diamond-cutting clusters produce 4% of the world diamonds; they include over 90 companies with 8,000 employees. One fourth of the companies are owned by foreign proprietors (from the USA, Israel, Belgium, India, the Netherlands, Luxembourg, the British Virgin Islands). The presence of foreign business in the Russian cutting industry is motivated by the owners' desire to have direct control of diamond resources. Whatever the business type, most diamond-cutting facilities are concentrated in the Smolensk Region, the Moscow Region, and the Sakha Republic in Yakutia.

The Smolensk Region has the greatest cluster which produces 50% of national polished diamonds; 54% of specialists in the industry work there. During its long history it has included from 4 to 11 cutting facilities: "Kristall", which has close partnership relations with "Smolensk diamonds", "Kristalldiam", "KD-Progress", "Smolensk-Tashe", "Smolensk-Oriental", "Almaz", "Sodruzhestvo", and "Gagarin". "Kristall" actively participates in the production of jewellery (the Kristall Jewellery Centre) and the company is undoubtedly the leader of the national diamond market as it produces the greatest proportion of national high-quality polished diamonds. This company is the only site holder of the De Beers Group, it specialises in the production of high-quality polished diamonds with the so-called Russian cut (it produces 30% of the world high-quality diamonds). The cluster includes not only cutting facilities, each of which has its own specialisation, but also educational institutions, gemmological laboratories and research centres.

The second cluster is located in Moscow and the Moscow Region. There are over 50 cutting plants with 18% of specialists working here. The largest companies appeared on the basis of the Moscow "Kristall" plant, which existed

in the USSR; they are "Brillianty ALROSA" (an ALROSA branch), "Ruise Diamonds" (Israel), and "Almazny Mir". The cluster includes cutting facilities, gemmological laboratories, centres of certification, the Association of the Producers of Diamonds, the Moscow diamond exchange, the State Treasury, the Diamond Chamber of Russia, educational institutions, etc. The cluster performs significant trading and business functions. It includes companies which work with primary rough diamonds (ALROSA) and secondary rough ones (auctions are carried out by the State Treasury, trading diamonds of special sizes, and the Diamond Chamber, which trades diamonds unsuitable for cutting). Moreover, all regulatory institutions are also situated in this cluster.

The third cluster is located in the Sakha Republic (Yakutia), the leading diamond-extracting region in Russia. More than 10 diamond-cutting facilities with 18% of specialists working in the industry are concentrated there; the cluster produces 25% of all polished diamonds in Russia. The biggest companies in the region are: Apple Diamond, the Yakutia diamond company, and Choron Diamond; they are active participants of diamond exchanges in Israel and Belgium. Besides, the Sakha Republic has a developed network of educational institutions that train different specialists for the industry, which is also widely supported by the Diamond Council under the guidance of the President of the Republic. The rich deposits of rough diamonds in the Sakha Republic serve as a prerequisite for taking decisions aimed at the creation of the diamond trading and industrial complex. A special free zone for diamond cutting and jewellery industries has been created there recently. However, high salaries (the cutting industry requires highly qualified specialists) typical of this region (the 'northern coefficient' is 1.6–2.0) and high energy expenditure (the status of a northern territory) make the production less competitive not only in Russia, but also abroad (India, China, Thailand).

**Jewellery clusters in Russia.** In comparison with the relatively young diamond-cutting industry, the production of jewellery has a long history and traditions. At present, there are over 400 jewellery producing companies, 100 of which play a key role in the creation of the national jewellery market, making 90% of the products. The industry employs 10,000 specialists who

work in four traditional centres of jewellery production: Moscow and the Moscow Region, the Kostroma Region, the Volga-Urals Region, and Saint Petersburg. Their leading position can be explained by the existence of state-run companies which produced jewellery here in the USSR. The regions have educational centres for training jewellers who preserve national traditions. Each region can be considered a cluster because each includes the largest producing companies, gemmological laboratories, centres of certification, regional guilds of jewellers, and hallmarking institutions. Moreover, each region is a large site for jewellery retail and wholesale trade (there are both large jewellery retailers and jewellery exhibitions).

The largest jewellery-producing cluster is located in Moscow and the Moscow Region (31% of jewellery-producing plants with 16% of specialists working in the industry). The cluster unites such leaders as the Adamas, Kameya, Estet and Bronnitskiy jewellery facilities. The development of the production and trade in the cluster is encouraged by the high level of consumption in the capital. The majority of jewellery exhibitions are held in the region, it also takes the leading position in the number of exhibitions organised here every year. The most famous exhibitions are: Jeweller (initiated by R.O.S. Yuvelirexpo, the oldest jewellery exhibition concern of Russia), Junwex New Russian Style, Junwex Moscow, The Best Jewellery of Russia, Gems and Diamonds of Russia, Moscow Salon of Applied Art, and the Jewellery Exhibition. The biggest jewellery retailers are the jewellery networks 585, Yashma-Zoloto, Adamas, and Almaz-holding. The Moscow Jewellery Plant has the highest profits in the region (even if it is registered in other regions of Russia).

One of the oldest jewellery clusters of Russia is located in the Kostroma Region (Kostroma, Krasnoe-upon-Volga), where 15% of the national jewellery is produced by 15% of specialists working in the industry. Many of the jewellery facilities working here, such as Diamant (Krasnoe selo), Topaz (Kostroma), Platina, Akvamarin, or Alkor, are recognised leaders in the amount of jewellery produced. The unique jewellery

festival, the Golden Ring of Russia, with a famous jewellery exhibition is held here every year, those events encouraging communication among Russian jewellers.

The jewellery industry in Saint Petersburg is characterised by significant changes and a high rate of development (11% of jewellery in Russia is produced there by 16% of specialists working in the industry). The largest plants of this cluster include: Sanis, Jewelers of the Northern Capital, and Samorodok. The cluster can also boast a modern exhibition concern RESTEK, which organises such exhibitions as Junwex, Piter Jeweller, and The Best Jewellery of Russia, held not only in Saint Petersburg, but also all over Russia.

The only jewellery cluster in Russia which uses local raw material is located in the Volga-Urals Region (it produces 5% of national jewellery). It is represented by such companies as the Jewellers of Urals and the Russian Gems Plant. In comparison with other clusters in Russia, exhibitions held in a 'million' cities here have their own specialisations: Yekaterinburg (Junwex Yekaterinburg, Jeweller of Urals), Ufa (Yuvelirexpo), Kazan (Yuvelirexpo), Chelyabinsk (YyzhUralYuvelir, Yuvelirexpo), and Perm (Jewellery Fashion).

The analysis of the jewellery clusters in Russia shows that the proportion of jewellery with diamonds is rather low and reaches a mere 6%.

In conclusion, it is necessary to say that, despite a high level of inter-industrial cooperation on the diamond market, industrial complexes are mainly typical of the global level. A cluster is considered to be the most common form of territorial complexes for this market. Clusters are typical of the diamond-cutting industry and trade, which can be explained by the specific market characteristics – b2b ('business to business' – a common basic market term frequently used in industry-specific analysis and denoting industry consumer markets). This character implies the presence of intermediary companies and, consequently, business infrastructure only possible within a cluster. There is less concentration of production in a certain area in the jewellery industry, which can be explained by the orientation of production to consumers, who influence the location of the industry.

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