

Features of the russian raw and cut diamonds business digitalization

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Abstract — A digital economy enters the industry. The article represents the digital transformation features of economic system of the participants of the Russian raw and cut diamond market. Various levels of digital technologies readiness and implementation into industrial production of the diamond industry of the countries participating in the global market determine the relevance of studying the project entry barriers. The raw and cut diamond of Russia intends to participate in the project of the Tracr digital platform development based of the blockchain technology. The author has considered conditions, opportunities and difficulties the enterprises of raw and cut diamond business of Russia will face with, in case of participation in the Tracr project. The entrance barriers with respect to business digitalization are highlighted. The new threats and challenges are identified, which can limit the implementation of the Russian raw and cut diamond business digitalization.

Keywords — *digitalization, information infrastructure, technological backlog, evaluation, gem industry, entry barriers, database technology blockchain*

I. INTRODUCTION

The feature of the Russian raw and cut diamonds business is the presence of all the segments of diamond pipeline in the country. The distinctive feature of the Russian raw and cut diamonds business is the differentiation of the production volumes of the diamond pipeline segments. Russia has significant reserves of natural diamonds and is the largest producer of diamonds, namely the AK ALROSA Group holds 28% of the world diamond production in 2017 [1]. But at the same time, Russia's presence in the midstream is insignificant (3% of the global volume of diamond manufacturers for 2017)[1]. The main reason for the weakening of the position of the diamond-cutting production remains weak management and insufficient costs for marketing[2]. Innovative development of the business is determined by various factors that ensure the innovative potential and activity of the market participants.

Actual trends in production management, caused by the introduction of innovations and digitalization in the production process, determine the need for the development of institutional and information environment of the business[3,4]. The implementation of digital technologies into the industrial process, including the arrangement of production, forms a synergistic effect of integration of industries due to the need for a unified information platform. Operation and maintenance of digital platforms stipulate the need for new labor force with

a wide range of competencies. The current system of clear separation between the diamond pipeline branches is rapidly approaching and eroding.

II. IMPORTANCE OF THE PROBLEM

Particularly relevant problem in the global market is the problem of identifying the authenticity of the product produced: the natural diamond or a diamond grown in a laboratory. Experts [5,6,7] identify two major threats to diamond mining companies:

- a) *Legal substitution of natural diamonds* (eco-diamond, conflict-free, impact diamond [8]); and
- b) *Illegal substitution of natural diamonds* (forgery, substitution by imitators and synthetics, conflict diamonds).

The diamond industry strongly condemns marketing techniques for positioning of lab-grown diamonds as ethically pure products. But at the same time, it is necessary to consciously emphasize that synthetic diamonds are the other products.

When synthetic diamond growing technologies become cheap, like synthetic rubies and cubic zirconias, they will not be able to compete with natural diamonds. Development and application of methods and procedures for diamonds identifying help to protect consumers and genuine manufacturers.

Modern technologies offer two ways to confirm the authenticity of the natural origin of diamond products:

- a) Examination of each raw or cut diamond with respect to the nature of its origin (natural or lab-grown) using the non-destructive instrumental methods of analysis: photoluminescence, infrared spectroscopy, etc.
- b) Comparison of product data against the reliable Tracr database (blockchain technology).

The Tracr is the first collaborative, dedicated digital platform created by the DeBeers diamond mining company that allows tracking diamond across the entire value chain [9].

However, the formation of a global information system on the movement of diamonds will cause a development of fundamental entry barriers for participants of the international market the decision of which should be reflected in the process

of formation of regulatory and ruling environment for the digital platform.

The study was carried out on the basis of reporting and analytical information of the largest companies in the raw and cut diamond business published on the official websites of companies by industry-specific analytic and consulting agencies: AWDC, Business Stat and Diamond Pipeline[1,7,10]. Scientific approaches to the global raw and cut diamonds market research are based on the theory and practice of scientists, experts and other researchers [6,11]. Theoretical and methodological backgrounds of the study were based on scientific works related to the issues of innovation and digital development of the following economics branches of the following scientists [12,13,14].

Transformation of social and economic systems on the raw and cut diamonds market under the conditions of unstable demand determines the need to develop adaptive mechanisms for increasing the investment and innovation attractiveness of market participants, especially of midstream, in order to obtain the added value. Proposals for managing the processes of business digitalization of the branches should be developed considering an assessment of investment and innovation potential of the branches of the business, regional features and global challenges. Identification of these aspects is in the focus of scientific research.

III. RESULTS

Digitalization of the raw and cut diamonds business may fall within the scope of the following end-to-end digital technologies:

- Big data.
- Distributed registry systems.
- New production technologies.
- Components of robotics and sensorics.

The application of digitalization in the raw diamonds mining business is aimed at projects of integrated IT infrastructure development over the following areas:

- Automated information and analytical production management systems of mining and processing plants.
- System of vehicles and mining equipment (GPRS) operation monitoring.

The application of digitalization in the cut diamonds production business is aimed at projects of integrated IT infrastructure development over the following areas:

- Updating of the software package for cutting production of Diamsoft-Energia Research and Production Enterprise[15].
- Introduction of digital technologies in the production research and prediction of raw diamonds cutting (scanning, analysis, automatic laser aided marking[16]).
- Introduction of advanced optical technologies to control the geometry and symmetry of diamond cutting (scanning, collation, analysis, report, database creation).
- Automatic information and measuring system for technical measurement of electric power consumption.

- Electronic trading platforms for cut diamonds and diamond jewelry selling (website, mobile application).

When comparing the readiness of the countries participating in the global diamond market against the digital economy, one can see that Russia is significantly inferior to such countries as the United States, Great Britain and Singapore. And also it is inferior to Israel, the United States and Singapore in terms of digital technologies use. Implementation of digital technologies into the Russian business structure is at a low level due to the underdevelopment of digital platforms and services, according to the World Bank's global development report (2016).

According to the assessment of the innovation infrastructure and investment into the innovation development, the ALROSA diamond company is competitive at the level of DeBeers, RioTinto, etc., but at the same time, the level of innovation in the midstream of Russia is a bottleneck and still remains uncompetitive[17,18].

Today, the development of the Russian raw and cut business digitalization is hindered by new threats and challenges[19,20]:

- Growth of international cybercrime in the field of data substitution and the inclusion of conflict diamonds in the database.
- Dependence of the development of the economic system of the Russian raw and cut diamonds business on the expert policy of the countries participating in the world market.
- Insufficient staffing level in the field of information security.
- Insufficient effectiveness of the institutional environment related to promising digital technologies, especially in the midstream.
- Challenge to the development of a complex hierarchical information and communication system of information data flow between segments of a vertically integrated diamond pipeline.

Implementation of digital technologies into the industrial process, including the arrangement of production, forms a synergistic effect of integration of industries due to the need for new professions emergence. Consequently, actual system of clear separation between the diamond pipeline branches is rapidly approaching. In the traditional system of profile specialists there was a principle of different profiles and different levels of competences, but in the modern conditions knowledge and information and the ability to analyze and use it to intensify the production go into priority. At bottom, an effect and need for the interdisciplinary competencies of specialists, i.e. horizontal integration, arises.

IV. DISCUSSION

At the stage of entry of the digital economy, the Russian raw and cut diamonds business will undergo a transformation in the following components:

- Production relations.
- Transformation of economic system structure.

- The need for new competencies of specialists; the transformation of the personnel training system is expected.
- The need for new requirements to communications, computing and information systems; the production process transformation is expected.

In the traditional system, the criteria for evaluating diamond products include weight, color, quality, and cut (4C). Under the conditions of digitalization, the appearance and consideration of the authenticity criterion is possible (5C).

However, the development of a global information system on the movement of diamonds will create significant barriers to the development of a regulatory and normative environment.

First of all, we have a question of settlement of the issue of the international format for entering data into the database. In other words, what classification format will be used for recording of raw or cut diamonds evaluation data? It is known that there are dozens of varieties of industrial classifications. The countries participating in the global raw and cut diamonds market have their own industrial diamond classifications and diamond pricing lists. Of course, first of all, when entering diamond data, a proposal to use the SITY international classification will appear, which uses criteria for assessing color and shape using terms (shape: Sh, Z, Ch, MB, etc.), (color: White, Yellow, Black, etc.). Russia uses its own industrial classification and evaluation of cut diamonds using digital criteria (color: 1, 2, 3, etc.) and (quality: 1, 2, 3, etc.). When evaluating cut diamonds, the GIA classification of the Gemological Institute of America is mainly used. Digitalization of data on diamond products determines the need for making an agreed decision on the use of SITY and GIA terminology unconditionally by all the market participants.

The second barrier that may arise when digitalizing diamond data is ensuring of the data authenticity and its information security. There is a need to develop mechanisms for managing the information system and, of course, there are also the regulatory issues. What forfeits and penalties will be applied to unscrupulous participants for entering obviously not reliable data?

The third barrier that may arise in the way of a digital platform development is a determination of the terms of the copyright of the data provided, or who will be the owner of the information? As it is known, the founders of companies in the global raw and cut diamonds market are the private individuals. In the era of the post-industrial economic system, the information (data) becomes a new asset and acquires a certain value (cryptocurrency). Taking this fact into consideration, the owner of the information (data) will have a competitive advantage over the other market participants. How will the relationship between market participants be regulated? First of all, solution of this problem requires a development of regulatory and normative acts.

V. CONCLUSION

To manage the processes of digitalization of the Russian raw and cut diamonds business, a development of high-tech division or enterprise is required the objectives of which will include development of end-to-end technologies and management of the digital platform, as well as being a

representative of the country in the global market. Under the conditions of blockchain technology development, a large amount of data on the movement of diamond products will be accumulated on a certain digital platform. At the moment, the Ministry of Finance of the Russian Federation has expressed a desire to manage and develop a digital platform for recording the movement of raw diamonds in Russia.

Considering the specifics of actual economic system of the Russian raw and cut diamonds business, it can be reasonably claimed that private owners are not able to provide the entered data with the sufficient information security and reliability level. How will the information environment in Russia be arranged and what form the information flow management system will acquire is not a defined issue, yet. To solve this problem, there is a need to create institutional and infrastructural conditions.

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References

- [1] C. Even-Zohar, Diamond Pipeline 2003-2017. IDEX Online News; Available from: <http://www.idexonline.com>
- [2] M. V. Nikolaev, E. E. Grigoryeva and A. A. Stepanov, "Aspects of creating priority development area for the diamond mining and processing industry in the republic of sakha (yakutia)," *Gornyi Zhurnal*, vol.9, 2016, pp.17-22, DOI:10.17580/gzh.2016.09.03.
- [3] A.A. Aletdinova, "Information Support for Management of Innovative Development of Organizations," Novosibirsk: NSTU Publishing House, 2013, p.273.
- [4] S. S. Mohtasham, S. K. Sarollahi and D.Hamirazavi, "The effect of service quality and innovation on word of mouth marketing success," *Eurasian Business Review*, vol.7(2), 2017, pp.229-245, DOI:10.1007/s40821-017-0080-x.
- [5] M. V. Nikolaev, E. E. Grigoryeva and P.V. Gulyaev, "Assessment of risks influencing innovation activity of industrial enterprises (on example of diamond-brilliant complex)," *Eurasian Mining*, vol.2, 2016, pp.6-10, DOI: 10.17580/em.2016.02.02.
- [6] T. I. Pototskaya, "International division of labor, the diamond complex: specialization and cooperation" *Regional studies*. vol. 2, 2013, pp. 52-60.
- [7] The Global diamond report. Bain and Company, Inc; 2018. p. 45. Available from: https://www.bain.com/contentassets/a53a9fa8bf5247a3b7bb0b10561510c2/bain_diamond_report_2018.pdf.
- [8] N. Y. Samsonov, A. V. Tolstov, N. P. Pokhilenko, V. A. Krykov and S. R. Khalimova, "Possibilities of russian hi-tech rare earth products to meet industrial needs of BRICS countries," *African Journal of Science, Technology, Innovation and Development*, vol.9(5), 2017, pp.637-644, DOI:10.1080/20421338.2017.1327922.
- [9] Tracr: Setting the standard for diamond traceability, De Beers; 2017. Available from: <https://www.tracr.com>. Tracr was conceived by De Beers in 2017 as a comprehensive mine-to-customer traceability solution for the entire diamond industry.
- [10] Analysis of the Russian jewelry market in 2010-2014, prognosis for 2015-2019. The Busines Stat report; 2014. Available from:

- http://businessstat.ru/russia/durable_goods/jewelry/analiz_rynka_yuvelirnyh_izdelij_v_rossii/.
- [11] V. Koki Costa da Nogami, F. Giovanni David Vieira and A. Rodriguez Veloso, "Concept of innovation in low-income market. [Conceito de inovação no mercado de baixa renda]," *Revista Brasileira De Gestao De Negocios*, vol.20(1), 2018, pp.127-149, DOI:10.7819/rbgn.v20i1.3044.
- [12] B. Bhat and B. Bowonder, "Innovation as an enhancer of brand personality: Globalization experience of titan industries," *Creativity and Innovation Management*, vol.10(1), 2017, pp.26-39, DOI:10.1111/1467-8691.00188.
- [13] M. V. Nikolaev, E. E. Grigoryeva and P.V. Gulyaev, "Assessment of risks influencing innovation activity of industrial enterprises (on example of diamond-brilliant complex)," *Eurasian Mining*, vol.2, 2016, pp.6-10, DOI: 10.17580/em.2016.02.02.
- [14] B. P. Radhakrishna, "Diamond exploration in india: Retrospect and prospect," *Journal of the Geological Society of India*, vol.69(3), 2007, pp.419-442.
- [15] Diamsoft – Energia: jewelry business software, Official website of Diamsoft – Energia, Available from: <http://diamsoft.ru/production/diam/ocenka.html>.
- [16] L. Mbayi, "Turning Rough Dreams into a Polished Reality? The Development of Diamond-Processing Capabilities in Botswana's Diamond Cutting and Polishing Industry" *The Global Diamond Industry: Economics and Development*. Vol.2, 27 September 2015, pp 229-250.
- [17] Annual reports of ALROSA, PJSC. Official website of ALROSA, PJSC. Available from: <http://www.alrosa.ru>
- [18] The diamond insight report, De Beers; 2018. Available from: https://www.debeersgroup.com/~/_media/Files/D/De-Beers-Group/documents/reports/insights/the-diamond-insight-report-2018.pdf.
- [19] M.V. Nikolaev and E.E. Grigoryeva, "Features of the diamond cluster project implementation in the Vladivostok free port zone," *Indian J Sci Technol*, vol.9(12), pp.89531, March 2016. DOI: 10.17485/ijst/2016/v9i12/89531
- [20] T.A. Salimova and E.V. Khakhaleva, "Implementation of the policy of import substitution as a condition for ensuring sustainable competitiveness of enterprises," *Digital transformation of economy and industry: problems and prospects*, St. Petersburg, 2017, pp.553-575, DOI: 10.18720/IEP/2017.4/24