Energy Intelligence

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Interview: Gazprom Neft Spearheads Russia's Digital Transformation

Gazprom Neft was the first Russian oil and gas company to announce the digital transformation of its business procedures. The company, Russia's third-largest oil producer, expects to halve the time for getting first oil from its fields and has already saved more than $1 million by switching its logistics management in the Arctic to automated algorithms. Andrei Belevtsev, director for digital transformation at Gazprom Neft, tells Energy Intelligence how the conventional oil business is changing and how much global majors can benefit as a result.

Q: What is the difference between digital transformation and digitalization?

A: For us, digitalization is a local improvement through the use of new technologies. These include machine learning, blockchain, quantum computing and others. Digital transformation is a comprehensive change in the company's business processes based on the opportunities that these technologies provide. We work on digital communication channels with our B2B and B2C customers, and also strive to increase efficiency through digital transformation in such business segments as exploration, production, refining, logistics and marketing.

Q: Why does the oil industry need technological change?

A: Digital transformation is the response to a number of global challenges. These include political and economic uncertainty, demand volatility, declining production at mature fields, development of hard-to-recover reserves and those in the Arctic and offshore. Now the key competitive advantage is not owning a field or a refinery, but having access to technology, which determines the ability to work with an asset economically. In the industry in general, a separate business segment is already being established that focuses on production management based on digital technologies, primarily machine learning and artificial intelligence.

Q: Which oil and gas companies in the world have already gone through digital transformation?

A: Most companies are now looking toward this direction, but it can hardly be said that some company has fully completed this process. Global majors, such as BP, [Royal Dutch] Shell, Equinor, are now working on this. But some elements of digital transformation are most likely to occur in relatively small companies. A good example is the Australian Woodside Petroleum. Also, BP recently stated that it overestimated the return on investment in digital transformation in the short term, but greatly underestimated it in the long term.

Q: How do Russian oil companies see the transformation?

A: Much is being said on the issue, but there is no consensus yet. Some still believe that digitalization is a threat to the security of their business, while others see it only as an opportunity to optimize resources and the number of staff. Gazprom Neft has a different approach -- our goal is to comprehensively manage the entire chain of business processes based on real-time data from all assets. The company's business is built up as a single organism, where information on one of the segments of the production chain realigns the work of other interconnected processes. Thus, the efficiency of the entire system as a whole, and not its individual fragments, is increased. Ultimately, all digital projects in close interaction with each other form a digital twin of the company. This allows you to reach a fundamentally new level of efficiency.

Q: What period is needed to go through the digital transformation?

A: This is a task that takes time; it cannot be solved in a year or two. For the large oil and gas industry, digital transformation is fundamentally more complex than for most sectors of the economy. Our business consists of managing complex physical and chemical processes, as well as a large number of complex manufacturing and oil production assets. Therefore, we work with a complex cyber-physical system, where the real production is combined with its digital counterpart. The volumes of data that our assets create and process are many times higher than those used by companies in retail, banking and the telecommunications market.

Q: In which business segments do you see the greatest potential effects?

A: We expect that new technologies and management methods will allow us, for example, to accelerate the implementation of large-scale production projects by 40% and to halve the period for receiving first crude from fields. Our goal is also to achieve a 3% increase in oil production at the company's oil fields. Gazprom Neft focuses on the use of digital technologies, including in the early stages of working with assets, when the maximum cost is created, because the uncertainties about geology are still too high and the adoption of quality decisions is critical. The amount of economic return from digital transformation after 2022 will be 3%-5% of Ebitda annually [Editorial note: in 2018, the company's earnings before interest, taxes, depreciation and amortization amounted to 800 billion rubles ($12.5 million)].

Q: For more than a year now, Gazprom Neft has had a business unit specifically responsible for digital transformation. What results did it manage to achieve over that period?

A: In total, we have over 500 digital transformation projects and our division has structured them into target programs. Each program has a specific business customer and clear performance criteria -- cost reduction, increased facility availability and other financial and technological indicators. We manage those programs through the prism of economic effect, but also allow a certain tolerance for the failures of individual initiatives. The task is to identify an unconfirmed hypothesis as early as possible, to adjust it and take it into account in future projects, to consolidate the experience gained by the company.

We managed to change the investment processes, primarily for digital projects of a high stage of uncertainty. Projects at an early stage are followed by three-month sprints. It used to take more time to just initiate a project. Now the system is structured in such a way that at the first stage a prototype of the solution is created, at the next, a minimum viable product, after which the product can move on to a more traditional development cycle.

We have developed a digital technology vision strategy. This is a technological radar with which we can set priorities for investments in scientific and research [programs], determine what needs to be done now and which technologies are not yet ripe. Now we are doing about 50 research projects every three months. The company has created competence centers for machine learning and artificial intelligence, virtual reality/augmented reality, "internet of things," robotics, blockchain, video analytic and product service design. Competence centers help communicate with the business customer, show him what we can do now, what can be implemented in the company, and what is happening in the technological world as a whole. This is the bridge between the world of technology and business. Each competence center has a dual purpose: for a number of projects, they are an executor, and for others, a point of consolidation of expertise for potential economic partners.

Q: Is it possible to evaluate investments in digital transformation?

A: Investments in implementing our digital transformation strategy for the next five years can make up to 5% of Gazprom Neft's total investments.

Q: Are there any solutions already implemented by the company that demonstrate the transition to new business models based on digital technologies?

A: Already-implemented solutions provide an opportunity to speed up the analysis of core data, well surveys, and seismic data. With the help of machine learning, we learned how to find additional oil-saturated intervals in the developed fields, expert systems suggest the optimal trajectory of horizontal wells in the reservoir, allow us to calculate thousands of scenarios of complex asset development projects and choose the most effective one. Already at the stage of exploration, digital technologies will begin to additionally bring to our company more than 6 billion rubles annually.

One of our flagship projects in this direction is Cognitive Geologist. This is a potential disruption project for the entire industry. Now most similar systems work on the principle that you need to collect the maximum amount of data, then a good model will be built. In our project, we were able to find the optimal balance between the amount of data and the result, we can determine the most probable conceptual geological model on a minimum amount of data and calculate the hydrocarbon reserves. That is, a huge amount of all kinds of data is no longer needed. The program itself will tell you what parameters for a particular field need to be refined so that it provides a highly accurate result. Having such a system, within two to three days we can get not just a conclusion by analyzing the information, but a clear model -- with what probability, with what confidence we can work with this asset.

Q: Does the company have patents for its technologies?

A: Over the past three years, we have received 80 patents for our scientific and technological developments. Every fifth patent has already been used in a real production process. Last year, the company received 30 patents for inventions, including one US patent.

Q: Are there any examples of digital transformation projects in the downstream segment?

A: One of the latest examples is the launch of a digital logistics management system in the Arctic, which allowed us to optimize the cost of exporting Arco and Novy Port crude grades by 10%. The system in real time monitors the location and movement parameters of tankers and icebreakers, monitors oil shipment and oil storage volumes, takes into account changes in ice conditions and other factors. Every day, it analyzes more than a million possible options and provides optimal logistic solutions. In fact, the new system, through the improved efficiency of logistics calculations, already allowed us to optimize transportation costs comparable to the annual rent of one additional tanker. Increased efficiency of the Arctic logistics through the digital transformation of the processes, already allowed the company to save some $1 million.

Q: Gazprom Neft also said earlier that it produced first "digital oil." What is the project about?

A: Gazprom Neft is testing a self-learning program that helps to extract more oil from existing fields without new infrastructure. The project was developed in partnership with IBM Services. At the beginning of this year, the system successfully passed the test at the Vyngapurovskoye field. It's application allowed us to get additional crude without new investments in additional drilling -- which is why the project was called "digital oil." The system gives a 70% probability to predict the location of oil deposits that are difficult or impossible to detect using traditional methods. The next step is to apply this system to a group of fields in the Noyabrsk region, where the combined potential is estimated at 3 million barrels of oil. There we plan to produce additional crude oil. Those reserves are located within the existing infrastructure. That is why their production will be very inexpensive. The cost of such production will be about $1.50 per barrel.

Q: Can this project get a wider distribution?

A: The oil fields Gazprom Neft works with in Russia are similar in geological complexity to fields in East Texas and Louisiana. These deposits have a large number of interleaved layers, and permeability is similar to deposits of the Wilcox formation. In this regard, Gazprom Neft's new technology will be very relevant for the US market, in particular, for companies operating mature fields like the Wilcox. Back in the last century, databases were accumulated for these deposits that need to be analyzed using modern technologies.

Q: Do you need new partnerships now?

A: Our company was initially focused on partnership. In terms of digital transformation, we look at companies with advanced digital skills. These are not only Russian, but also international companies, including IBM. Our company is ready to share with our partners its unique experience and conceptual engineering software products that allow one to make justified investment decisions in the early stages of field development and during development.

Q: Do you see the risks in buying ready-made digital solutions?

A: If there are existing technologies that can be implemented with a good economic effect, we are ready to introduce them. The problem is that in many areas there are no existing solutions. In addition, today we see that there is a process of changing the way technology is created. Previously, many large IT products were created by a development company and were offered to a client along with a certain template of a specific business model. Now whole consortia are working on new technologies, where oil company specialists work together with several leaders in various segments of the IT industry. Such projects are based on a deep understanding of the business process itself and on the analysis of data already accumulated in the industry. Most development companies do not have depth of industry knowledge or accumulated data. And the task of our digital transformation is to learn, together with partners, to create products based on our business processes and experience. However, I repeat, we are open to the market and are ready to buy ready-made solutions if available.

Q: Do you refuse to use foreign software?

A: We look at this issue in terms of assessing the risks associated with the use of any software. There are economic risks, sanctions, but there are also risks of solvency or insolvency of the supplier of technologies and equipment. For example, today the company General Electric, one of the largest suppliers of technology to the Russian market, is experiencing difficult times and it is difficult to predict how it will function.

Q: How will you act if external restrictions on foreign hardware and software are introduced?

A: We will make decisions in accordance with our risk management policy. We conducted an analysis for ourselves from the point of view of those areas where we saw the most critical consequences, and closed these gaps with our own developments and decisions of Russian partners. Today, under any scenario, we do not see any threat to stop the company.