

Building the service company of the future



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We have cause for great optimism and enthusiasm about the future of our industry. Innovation and experience are making complex reservoirs – such as shale deep water – economically viable and boosting reserve estimates to levels that would have seemed fantastic a few years ago, while also helping increase production from mature reservoirs. In the next decade we will see enormous opportunities in exploration and production – if we evolve to meet the challenge.

Service companies in particular are changing. I want to sketch the changes and investments we are making that will enable us to provide a higher level of service and realise the opportunities that are coming into view. I also want to discuss the key themes that will persist in all phases of our business cycle; these are the areas where we will be making investments year in and year out.

Two themes are likely to intensify and dominate the next decade because they are the foundation of the higher level of service and value creation that complex reservoirs demand. These themes are the holistic approach to reservoir development, and the acceleration of innovation and organisational learning.

Holistic solutions for complex reservoirs

Whether it's tight gas in the Middle East, pre-salt plays offshore Brazil, or shale oil in the Bakken, the geological and technical complexity of these enormous new basins – combined with their capital intensity and long development times – make a holistic approach the only economically viable option.

Deliverability throughout the life cycle of the reservoir requires operators and service companies working together to take time and cost out of each step – from prospect generation to production. And each step needs to be integrated with the others to become a holistic solution that includes all the elements – from reservoir description to drilling, well completion and production management. Helping operators achieve that holistic solution is the way service companies are adding the most value.

This is demanding changes in the way service companies operate. In technology, we create the cross-functional workflows needed for holistic development. And we are changing organisational structures, training, and work processes to help us speed up our learning and help us mobilise the right expertise at the right moment for the

particular reservoir development need. We take a holistic approach to creating holistic reservoir solutions.

Integrated workflows create efficiency at the wellsite

The definition of cost-effective service delivery is evolving. In complex reservoirs, it is not enough to deliver a discrete service at the lowest cost. The service must be optimised for the well, and it must also contribute to optimizing the whole. At the wellsite, this means using services that incorporate real-time data capture and respond to real-time decision making, and services that integrate into holistic development planning. Cost-effective services are now ones that minimise costs for the whole project and provide information and knowledge that can be used to help optimise the plan. And these are also the services that can feed organisational learning, create databases and expertise that help optimise the next project in that basin, and provide insights useful for developments in other basins and other continents.

Integrated workflows in a collaborative environment, which combine discrete services, are the next level in value creation in complex reservoirs. Such workflows in reservoir evaluation, real-time stimulation and completion design, and an optimised drilling process, are producing dramatic results in North American shale basins, and they are equally applicable to complex reservoirs worldwide. In the future, we expect that similar advances developed for India or Brazil or Russia will also set new standards of productivity.

For example, we are linking specialised reservoir evaluation and modeling technologies to select the correct rock to stimulate. By fracturing only the most productive rock, we have increased production up to 30 per cent in one reservoir, compared to offset wells. In another project, by fully integrating drilling services, drill bits and drilling fluids, the operator saw a 55 per cent reduction in drilling days over the course of drilling 50 wellbores – a great illustration of the power of rapid learning. On the same project, by combining logging, stimulation and completions, the operator was able to almost double the number of producing zones completed in a month.

The trend is toward treating larger pieces of the project as a whole, because that is where we can create the greatest value. In one North American basin, we partnered with the operator to optimise full field development starting with the first well. By integrating 3D seismic, microseismic



fracture modeling, geological interpretation and completion data, and by modeling to optimise both the well construction parameters and completion strategies, we estimate the operator will see a 20 per cent increase in ultimate recoveries and a 10 per cent unit cost reduction over the life of the field.

Reducing environmental impact

Our work is increasingly being judged not only by the energy produced, but also size of the operation's footprint and the ultimate impact on the area. These concerns and this scrutiny will most likely continue to increase.

Our response is to create and introduce technologies with these goals in mind and plan developments that will maximise safety and reliability and minimise footprint for the long term. These are substantial investments, but they are necessary for our long-term success. We do not consider these efforts optional extras; we regard them as part of our core competency.

For example, in North America, hydraulic fracturing has become a much-discussed question as shale development moves into heavily populated areas. We anticipated this, and have introduced a suite of fracturing technologies that set new standards for minimizing impact. These include a fracture fluid system comprised of materials sourced entirely from the food industry, a service that uses ultraviolet light instead of chemical biocides to control bacteria in fluid systems, and a system that uses electrocoagulation to treat flowback and produced water to make it reusable. These technologies are in service now, helping to reduce our footprint and overall impact.

People are the core

Delivering these solutions also requires another set of changes, the second theme I mentioned at the outset: we are changing to speed up organisational learning and knowledge management.

Creating integrated workflows is dictating a change of emphasis within the organisation, because it requires an organisation that cultivates and values collaboration across business units and across disciplines. This is a substantial cultural change that is taking place in stages. One successful collaboration begets the next, and gradually the number of integrated workflows grows, and the scope of the integration broadens to become more holistic.

The ability to mobilise the right expertise anywhere in the world to solve the particular development challenge

is a more visible source of value. We think of it as bringing the full intellectual capital of the company to bear on the situation – knowledge management in its highest form. Our Consulting and Project Management product service line is explicitly built along these lines. It exists outside our divisional structure and pulls experts from all disciplines for specific challenges.

North America's shale basins provide an illustration of how the knowledge management approach can work. We invest in reservoir understanding, and in developing holistic solutions based on that understanding. We have a 'tech team' assigned to each basin – a multi-disciplined team of individuals who are the experts in that basin. They have the knowledge and experience to develop and apply the total solution that draws upon all the capabilities of the company. They are the ultimate integrators and the architects of the holistic solution.

Part of their mission is sharing their knowledge and insights with the rest of the organisation. They link up with tech teams from other basins. They make their data and results available, and they consult with other teams where they can contribute. This will be especially important outside North America, where 75 per cent of the shale reserves are located. Sharing the tech teams' knowledge with our staff in other regions where shale development is just getting started will be crucial to accelerating value creation.

To help speed this process, we bring experts from other regions and embed them with our North American tech teams for a year or more to acquire first-hand experience in reservoir knowledge, scenario testing, development planning, and engineering for every phase of the project. This will shorten the learning curve for emerging complex plays. The process will also work in the opposite direction, as insights and techniques developed for offshore Brazil or Indonesia are transferred to North America. The systematic sharing of cutting-edge expertise will be a permanent part of our life.

These trends also influence the way we recruit and develop employees. We search the world for top engineering and business talent, work with universities on every continent to help shape curricula and promote the opportunities in our industry. And we provide employees with a breadth of assignments to help them become more flexible and more able to contribute to holistic solutions.

Greater integration across disciplines also demands a new level of reliability and predictability in service delivery, →



→ which in turn requires a new generation of competencies and skills. In response, we are broadening our training and formal competency system to provide both a predictable inventory of skills for the organisation, and a clear path to advancement for employees.

At the same time, we are standardising work methods around the world to provide both greater uniformity in the services we deliver, and more flexibility and responsiveness to new needs. Standardised work processes will help speed up innovation and learning. Innovations in practice can be captured faster and spread across the organisation. People can more easily transfer to new geographies. We can roll out new technologies more rapidly. In short, these practices will help speed organisational learning and contribute to developing and applying holistic reservoir solutions.

Flexibility and rapid response

There are other long-term changes that contribute to flexibility and rapid learning. To help us develop tailored solutions, we have created regional technology centres in India and Singapore. Currently there are some 250 technologists working in these two centres. And we are building centers in Saudi Arabia and Brazil that will have a similar mission – technology, applications and experience for specific customers and challenges. And the knowledge created in these basins will be a valuable asset to be shared throughout the organisation.

We are also distributing our manufacturing capacity and supply chain around the world and bringing them

closer to customers and basins; this helps the organisation respond more quickly to local needs. Combined with an efficient global logistics operation, we can better manage materials and equipment so they are where they are needed most.

Finally, faster organisational learning and faster, more uniform spread of best practices will help with regulatory compliance. We expect the regulatory environment to become more uniform and more detailed across the globe. To succeed in that environment, service company practices will also need to become more consistent and uniform. And by doing this, service companies will also be able to contribute to effective regulation. For example, we are collaborating with authorities to develop new standards for offshore work in the Gulf of Mexico. And consistent, uniform regulation will help us create the technologies and practices that reduce our footprint and environmental impact. After all, the fundamental challenges are the same worldwide.

The world needs big ideas, big energy projects and big results now more than ever. To get them, we will need the horsepower and work ethic service companies have provided for generations. And we will also need smart, high-performing service companies that can help operators develop optimised solutions for their complex reservoirs and speed up the process of innovation and organisational learning. If we build organisations with those needs in mind, we will once again overcome all the pessimistic forecasts and deliver the energy our civilisation needs. ■



Photo courtesy of Gazprom