The increasing diversity of oil and gas resources presents technical challenges for our customers—and at the same time opportunities for oilfield services companies. The challenges range from reducing subsurface risk as exploration and appraisal begins, to increasing the ultimate recovery achievable when the reservoir reaches the end of its economic life. These challenges can be impacted by technology, workflow, people, global back-office support, software, and by business models, which are evolving as the demand for integrated operations has increased over the years.

**Business Models Evolution**

In terms of business models, the integration of products and services with workflow and process can take many forms. Fig. 1 shows the evolution of business models for our industry. As the pace and complexity of operations have grown, the traditional approach—typically known as “discrete” services—has become increasingly inefficient and expensive for our customers to manage. To control costs and minimize downtime, operators may solicit tenders for “bundled” services, lumping together several related discrete offerings from a single supplier for a lower total cost. While this “bundled” approach may reduce the price, it often fails to boost efficiency, especially when the entire product lines and in many cases, the individual service provider, continue to function independently.

Given these drawbacks and the magnitude of the challenges facing the industry today, both onshore and offshore, what we need are truly integrated operations. So you might be wondering: What is an “integrated” operation? Put simply, it is one in which the interactions among the parts are fundamentally different than they have been in conventional discrete or bundled services operations. In integrated operations, all the products, services, and personnel are streamlined and coordinated across the usual domain boundaries as if they were a cohesive system with a single objective.

As an industry, we need to integrate services in field operations, at the well site, as well as technologies and engineering workflows back in the office. The ultimate integrated operation would be one in which both parties—oil company and service provider—work together as one, removing the duplication of efforts that is currently taking place.

Our Integrated Project Management business is one example of this. It is made up of well construction and production management projects and we have a large organization that supports these types of projects. It was started 19 years ago to address a growing requirement to integrate services and technologies and has grown into a portfolio of multiyear, multiyear contracts as well as into technically more challenging work in deeper and tougher wells. The majority of the contracts are long term. The evolution of these business models has changed from the mid-2000s to year-end 2013, with a trend toward integrated-type projects.

**Unconventional Resources**

With the onslaught of the shale gale, it seems only natural to talk about unconventional resources and the impact integrated services has had on our customers’ business. Today, a large percentage of the perforation clusters in the lateral are not effectively being stimulated and, therefore, not producing any hydrocarbons.
Industry research shows that 36% of perforation clusters are on average not producing and 40% of the wells drilled are not economical; that is something that needs to concern all of the industry. The goal should be to improve drilling and completion efficiency and, to do this, wells should be placed appropriately in the reservoir and the reservoir and completion efficiency should be done such that optimum producing fractures are created. Moving from the traditional brute force approach to engineered wells has resulted in, for one particular customer, 82% of the perforating clusters producing and their wells being top-quartile producing wells compared with offsets.

Deepwater Integration

Deepwater has been and will continue to be one of the fastest-growth operating environments. In the past 5 years, more than half of the total reserves found have been in a deepwater environment. This success did not come without several challenges. Some of these challenges are related to above-seabed aspects such as remote operations, new regulatory requirements, and deeper-water prospects, while other challenges are below seaboed such as complex geological and reservoir characteristics.

The above- and below-seabed challenges have added substantial operational risk and have affected overall deepwater project cost. For this unforgiving environment to remain economically viable in the long term, consistent efficiencies must be achieved. The logistical and operational risks inherent to deepwater operations must be identified and mitigated to ensure that costs can be properly managed.

Economically successful deepwater operations must have sound project fundamentals locked in place, and should be characterized by four solid foundations that standardize performance in this environment to bring together the right people, technology, and process.

The development of new fields and the continuity of exploration activity will drive a further increase in the number of deepwater wells, from 700 in 2014 to an estimated 1,300 wells by the end of the decade. This projected growth in wells, in combination with the increasing requirement to intervene in mature fields, will require serious improvement in operational efficiencies across the industry.

As the industry becomes increasingly familiar with the operational challenges in such unforgiving conditions, attention must inevitably turn to tackling the economic challenges that deepwater operations present in the long term. The increase in field-development complexity will need to be offset by efficiencies improvements. We anticipate deepwater capital spending to reach USD 150 billion by the end of 2020, which is in line with the pace of compound annual growth rate of 11% that we have seen in recent years.

When this is considered against the currently tight supply/demand balance of ultradeepwater rigs, it is not surprising that the cost per well has been driven up strongly over the past few years. The average cost of a deepwater exploration or appraisal well in 2012 reached USD 150 million. These challenges demand that operators and service providers
work together—otherwise deepwater project economics may become both marginal and questionable.

Deepwater service delivery focuses on four main executional foundations.

The first is competency assurance. Deepwater crews should be technically assessed and certified to operate in an offshore environment that requires special attention be paid to well-integrity capabilities and superior operational efficiency.

The second foundation covers planning and risk management. Companies should engage their customers early in deepwater project planning, especially in new frontier areas. This practice allows working together to better identify and manage operational risks, often before they arise, through a systematic process that ensures project readiness.

The third foundation is a broad and expert technology portfolio. Technologies should be developed with two important drivers in mind—superior reliability and operational efficiency.

The fourth foundation is integrated services project management. The model can be used with a variety of customers, including integrated service companies, major resource holders, and independents.

If these executional foundations are in place and all engineering and service delivery components are fully integrated, typically a company will experience a 40% improvement rate in nonproductive time when compared with deepwater projects delivered by means of discrete services. This is significant and could make the difference whether a deepwater project delivers the right return on investment.

Business Models: Value for the Industry

The value of integration can vary from project to project. Fig. 2 shows a project that we worked on with a client working in an unconventional reservoir to document the value that would be achieved with different business models. We indexed discrete services as a net present value (NPV) of 1. We then compared the value of each of the other business models with discrete services to calculate the NPV gain that would be achieved from each of these types of engagement. As you can see, real value comes when an integrated-type project approach is used.

Our industry is not static and, to be successful, it takes a conscious decision and strategic vision to begin integrating technologies, services, and disciplines that have long been segregated or merely bundled. Business models with E&P customers will need to continue to evolve from discrete to more integrated services to ensure maximum possible efficiency. Improving performance in challenging environments such as deep water and unconventional developments is key. Integration leads to improved efficiency, reliability, and economic gains for our customers, which is the best manner to drop the cost per barrel in exploiting hydrocarbons. JPT

Patrick Schorn is president of Operations & Integration with Schlumberger, a position he assumed in July 2013. Prior to his current role, he held various global management positions, including president of the Production Group; president of Schlumberger Well Services; president, Schlumberger Completions; and marketing manager for Well Services. Earlier in his Schlumberger career, Schorn was general manager for the Russia GeoMarket after holding management and engineering positions in France, the US Gulf of Mexico, Peru, Argentina, and Russia. He began his career with Schlumberger in 1991 in stimulation operations in Europe. Schorn holds a BS degree in oil and gas technology from the University Noorder Haaks in Den Helder, the Netherlands.