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Oil and gas talent management powered by analytics

Adopting analytics to effectively manage workforce needs

Deloitte Center
for Energy Solutions

Contents

Executive summary

Oil and gas companies have increasingly relied on complex data to delve into the Earth's geology and find energy resources thousands of feet below the surface. They have turned to numbers when analyzing prospective acquisitions, capital expenditures, and other investments. Yet, when it comes to managing their workforces, oil and gas companies have not yet adopted the quantitative rigor that they use so effectively across their businesses.

At a time when technological innovation and globalization are ushering in a new era of industry growth, large segments of the workforce are reaching retirement age, and with potential recruits from educational institutions remaining scarce, the competition for talent can now be as significant as the focus to find new resources.

Leading human resources (HR) organizations within the oil and gas industry are starting to effectively use data analytics to help identify, recruit, retain, and develop skilled talent. By blending internally available data with external statistics and information related to the labor supply, these HR leaders within the industry are positioning themselves to effectively manage changes brought forth by this volatile operating environment.

Managing a moving target

Oil and natural gas plays have been as fickle as fashion in recent years, thanks in large part to technological advances, such as horizontal drilling, combined with multi-stage hydraulic fracturing, which have given companies access to previously unattainable or uneconomic resources. The dramatic changes in the quantities, locations, and price volatility of the hydrocarbons unlocked by technology create a significant challenge in aligning human capital resources with the various market demands.

This challenge is tough for companies with balanced portfolios of natural gas and oil assets; they can theoretically shift manpower from one side of the business to the other as market conditions warrant, but that becomes much more difficult as volatility increases. The challenge is even harder for companies with a heavy tilt toward either oil or gas, as market swings may force them to reach outside the organization to staff up quickly in one area, while needing to rightsize the workforce in other areas.

Adding to this complexity is a shrinking pool of available talent. A wave of older workers is reaching retirement age, and universities in North America and Europe are not producing enough skilled graduates to replace them. In addition, workers are increasingly mobile and technology advancements continue to change both the type of work and where it can be done. These factors are exacerbating the war for talent by extending competition beyond local, and even national, labor markets.

In the past, annual estimates of workforce needs proved sufficient. Now, the need for certain skills can change dramatically over the course of a year. The degree to which HR organizations anticipate these changes can spell the difference between being ready to support the company's growth or inhibiting it due to a lack of skilled people.

Some in the industry have advanced their workforce planning in recent years by turning to resources such as enterprise resource planning systems to compile more data on their existing talent. But many HR leaders have been unable to distill such data into useful and actionable information. As a result, some have turned to blunt instruments such as pay increases and competitive incentive awards, which have shown to be no silver bullet when trying to acquire or retain talent.

Thinking like an economist

In today's operating environment, it is more critical than ever that oil and gas companies stay on top of the statistics — not just the data they have historically used to map the Earth's topography, plot acquisitions, and invest in new opportunities, but also the information they need to paint a well-defined picture of their future workforce needs. The industry's HR leaders have to think like an economist — someone who studies and directs the allocation of finite resources.

By necessity, this may require a change in mind-set. Oil and gas companies, like their counterparts in other sectors, are accustomed to following their own internal "leading indicators." The dynamic pace of change and competition, though, demand that they now look outward as well. This added degree of data mining may require information as diverse as labor market conditions, employment shifts, employment trends in industries, and the cultivation of talent with transferrable skills.

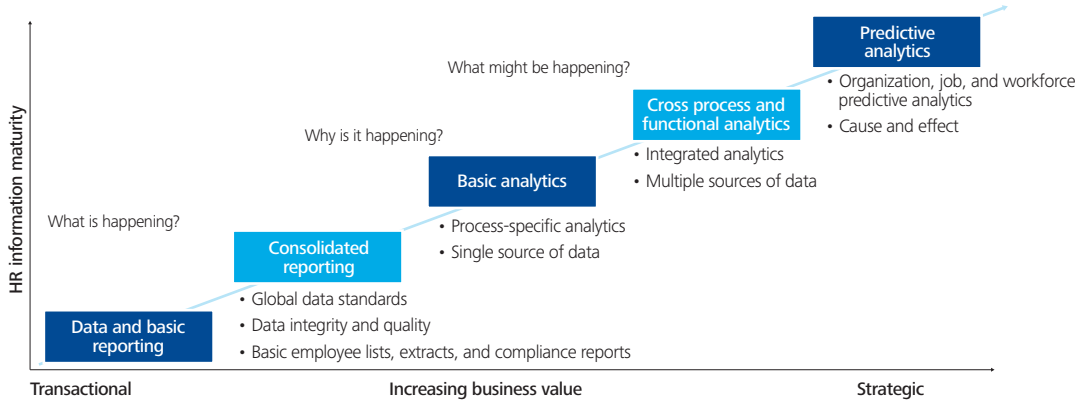
This is not an invitation to dive headfirst into a limitless pool of data. Rather, it is a call to do what economists do: maintain a 360-degree view of the key indicators, near and far, that matter to the business. HR organizations need to apply macroeconomic data and other external knowledge to inform sound decision-making. An economist-minded HR leader can create a business strategy by using specific economic indicators to predict HR changes. For instance, data on international mobility trends can track the flow of talent and help direct a mobility strategy that effectively navigates talent shortages or surpluses.[1]

Traditionally, organizations have focused on data integrity and reporting that is specific to core applications. The need for more meaningful and insightful information is shifting the focus from reactive analysis to foundational and advanced, and/or predictive, analytics, thereby pushing organizations further along the information maturity curve (Figure 1).

This maturity curve illustrates the transition from a reactive HR organization to a more proactive one that not only reports on what happened but also anticipates what could happen in the future and takes required action. The deeper HR organizations are able to pursue workforce analytics to account for variables such as regulatory changes, economic outlook, and labor supply shortages, the further out on the information maturity curve they will be able to delve. In the oil and gas sector, three key dimensions may serve as a logical launching pad on this evolutionary journey toward better, more actionable insights:

- **Workforce planning:** preparing for acute market-driven changes that alter a company's workforce needs
- **Talent acquisition and movement:** understanding the impact of pending retirements and changing business strategies, and adopting data-driven approaches for hiring or developing the next generation of talent
- **Retention:** measuring and managing workforce turnover issues to mitigate the potential loss of the investment required to train and develop new resources

Figure 1: The information maturity curve



Source: Global Business Driven HR Transformation: The Journey Continues, Deloitte Consulting LLP

[1] "Human Capital Trends 2013," Deloitte Consulting LLP, 15 Apr. 2013, http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/Consulting/us_cons_humancapitaltrends2013_040213.pdf.

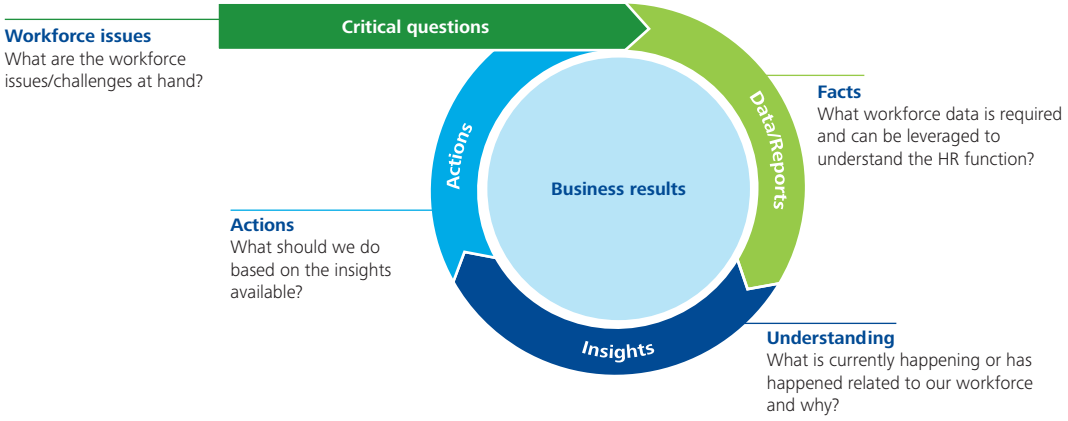
Aligning workforce planning with future demand

In many industries, advanced workforce analytics can help companies hire to fuel growth in the right places. It is arguable that few other industries could benefit as much as the oil and gas sector from this approach, especially given the dynamic nature of market forces and their costly impact on workforce resources. The industry's extensive experience using predictive modeling to forecast their needs for capital spending, production, and raw materials puts it in a position to simply extend this capability to workforce management. In fact, it not only makes logical and financial sense — it's also aligned with the culture of oil and gas companies.

Workforce analytics offer a fact-based approach to addressing workforce-related issues. Methodologically, an effective analytics approach uses predictive modeling techniques to identify and respond to workforce issues, such as the need to improve talent management strategies. A bimodal workforce analytics process consisting of both the analysis of current and historical data to make assumptions about the future and also the use of predefined external variables, such as location-specific gross domestic product and labor statistics performance, can create targeted insights through predictive modeling. Insights and trends uncovered through workforce planning and analytics approaches provide the opportunity to create targeted programs that yield tangible results.

Consider for a moment how useful it would have been in recent years for an oil company in the Williston Basin to anticipate the potential staffing needs of a possible emerging unconventional play based on similar occurrences in other plays. Where would they find workers to meet the demand? What kinds of recruiting strategies would they use to fend off competition from others? Would they be able to draw on internal resources located elsewhere?

Figure 2: Predictive modeling feeds better business results



Source: Global Business Driven HR Transformation: The Journey Continues, Deloitte Consulting LLP

How one oil and gas company used analytics to achieve their growth strategy

These are the types of critical questions that an independent oil and natural gas exploration and production company recently addressed to help staff up amid an increase in oil production in Alberta, Canada. Like many oil and gas companies in this remote and intensely competitive region, the company was already challenged in trying to find and recruit workers for critical occupations such as engineers and maintenance technicians.

The HR team took the required first step by beginning to ask some critical, forward-looking questions: Based on the company's growth objectives, is the increase in production and development demand we are projecting sustainable from a talent standpoint? If not, how much does supply lag demand? How can we address this gap?

To help answer these questions, the company commissioned a detailed workforce needs analysis that focused on four specific areas:

1. **Labor supply projections:** detailed 10-year skill supply projections for critical occupations across Canada, and the potential impact of current and future demographic changes and other macroeconomic variables affecting the labor supply in the country
2. **Oil sands production and labor demand forecasting:** projected oil production trends for the company and the rest of the industry across Alberta
3. **Comparable industry and community mapping:** identification and mapping of comparable industries and communities that could provide an appropriately skilled alternative source of labor for critical occupations
4. **Educational statistics:** consolidated list of academic institutions and programs that provide graduates with the skills applicable to the critical occupations in question, as well as projected graduation and placement rates for engineering programs across Canada

Once the company's HR leaders had this analytical data in hand, they were able to better understand how internal and external drivers would likely affect the workforce in the coming years. They then began to shape their talent management approach to help the organization achieve its growth strategy in a competitive labor market. In addition, the company was armed with the analytical tools and processes to keep up with changes in these drivers and adjust their strategy accordingly.

Mastering talent acquisition and movement

Employees come and go — this is an unavoidable fact in certain respects, as in the case of retirement. Generationally speaking, U.S. employers are bracing for what will likely be the largest wave of retirees ever as more of the baby boomers reach retirement age over the coming decade.

In the oil and gas industry, retirements pose a particularly difficult challenge. The industry is bracing for a serious shortfall of experienced technical professionals over the next several years due to natural attrition. A 2011 survey by Schlumberger found that the industry will likely lose a net of 5,000 experienced geoscientists and petroleum engineers by 2014 as recruitment falls short of projected retirements.[2]

Figure 3 demonstrates how economic indicators, such as the trends for oil and stock prices, correlate to talent management issues, such as the increasing retirement of baby boomers born in 1946.[3] Those born in 1946 are the oldest of this age cohort, and as baby boomers continue to reach age 65, we expect the number of retirees will continue to multiply. The 26 percent increase in retirement experienced from 2008 to 2011 by those born in 1946 will be succeeded by comparable retirement increases in the younger baby boomers over the next several years.

Figure 3 represents a correlation between lower retirement numbers associated with lower oil and stock prices and increased retirements associated with higher oil and stock prices. As such, with the increase in oil and stock prices, the retirement reprieve experienced in the oil and gas industry over the last several years is about to reach a conclusion, and companies will need to shift their focus to targeted talent management insights. Time is of the essence, so fact-based, analytical models will finally need to be put in place to address an ongoing issue that has gone largely unchecked for many years due to the economic downturn in 2008 and its associated retention benefits.

Figure 3: Industry retirements are highly correlated with oil and stock prices

Oil price vs. S&P 500 Index prices, 2007–present

Source: Deloitte Consulting LLP analysis and Metlife.com[3]

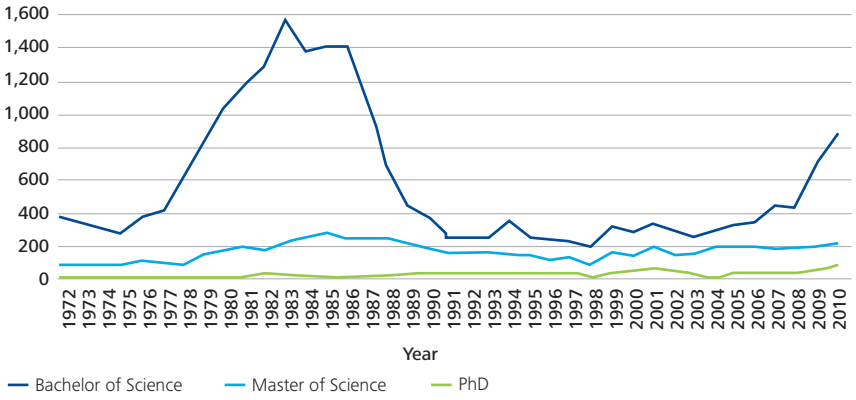
[2] Brett Clanton, "Retirements to Take Toll in 'Petrotechnical' Fields," *Houston Chronicle*, 30 Mar. 2011, http://www.chron.com/business/article/Retirements-to-take-toll-in-petrotechnical-1693235.php.

[3] "Transitioning into Retirement: The MetLife Study of Baby Boomers at 65," MetLife Mature Market Institute, Apr. 2012, https://www.metlife.com/mmi/ research/transitioning-retirement.html.

The challenge is as much about the number of workers retiring as it is about those ready to replace them. The number of new graduates with petroleum engineering degrees has increased in recent years (Figure 4), but the fact remains that U.S. universities and colleges are still only producing about 1,000 – 1,200 skilled market entrants each year, woefully short of what will be needed to meet increased demand to support the industry's growth.[4] As troubling, demand has remained flat for master's and PhD petroleum engineering programs, contributing to a dearth of educators.

These conclusions are supported by a recent Deloitte analysis of petroleum engineering degrees awarded during 2012. We examined a representative sample of eight of the largest U.S. petroleum engineering programs – used as a proxy for the number of petrotechnicals entering the industry. The analysis revealed that these critical programs produced only 736 bachelor's students, 232 master's students, and 56 PhD students, which is a small fraction of the total petrotechnical graduate hires needed each year for U.S.-based oil and gas firms.

Figure 4: U.S. Petroleum engineering degrees granted



Source: Society of Petroleum Engineers

[4] Stephen Holditch, "Tap into the Talent Pipeline," Harold Vance Department of Petroleum Engineering, Texas A&M University, Feb. 2010, http://www.spe.org/jpt/print/archives/2010/02/7GuestEditorial.pdf.

Furthermore, the member composition of the Society of Petroleum Engineers (SPE) has changed significantly in the last 15 years.[5] As shown in Figure 5, SPE membership among 20 – 34 year olds is higher than it was 15 years ago, but there is a massive disparity between the 1997 and 2012 samples in the age group slated to become the next generation of leaders, specifically, those in the center of the age continuum. The paucity of 35- to 50-year-old SPE members should be a call to action for companies employing petroleum engineers, namely companies within the oil and gas industry.

Thus, in an industry with high interest levels, low numbers of educators, and increasing industry demands, it is imperative that HR leaders devise anticipatory talent recruitment strategies to fill company positions and relieve stress in an already strained situation.

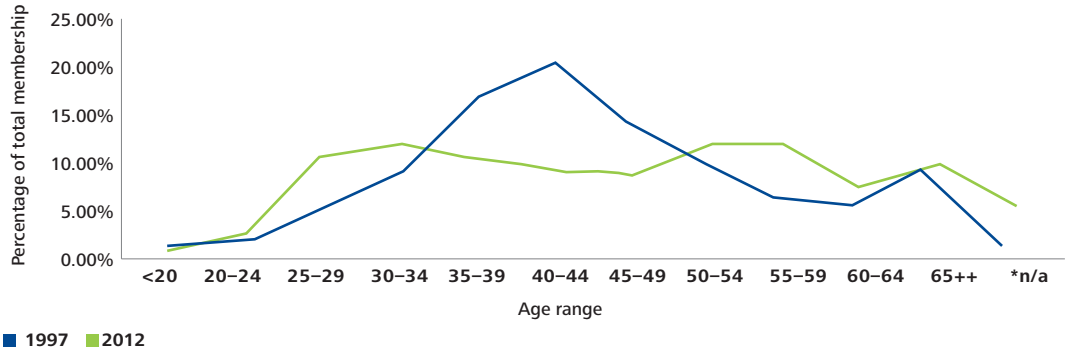
Many leading companies in other industries have begun making their own plans to address increased retirements and help prevent critical skills gaps that could derail their growth ambitions. These plans have incorporated a number of forward-looking initiatives designed for a smooth transition. They include succession planning initiatives, accelerated development and mentoring programs, enhanced recruiting strategies, and knowledge transfer programs.

Recently, a large domestic coal producer needed to understand the risk posed by likely retirements after completing a merger with another company. Operational leaders knew the company would not be able to run some key mining operations if those in supervisory positions walked out the door.

The company conducted an analysis that helped establish its worst-case talent scenario where each worker who was eligible to retire did so when their retirement plan vested after 20 years of service. The leaders then had an idea of where likely talent shortfalls would appear. Having the data synthesized in one place put them in a position to begin developing targeted solutions.

These solutions included an accelerated executive leadership program that used job rotations to cultivate internal talent from the management ranks and prepare them for senior positions; an emerging leaders program to identify younger talent with potential and assigning them a mentor executive coach; and a rebranding of the company's recruiting strategy to help attract young mining engineers.

Figure 5: SPE membership demographics (membership by age range)



Source: Society of Petroleum Engineers

[5] "SPE Membership Demographics: 2012 Year-End Summary," Society of Petroleum Engineers, Dec. 2012, http://www.spe.org/about/docs/2012_yearend_summary.pdf.

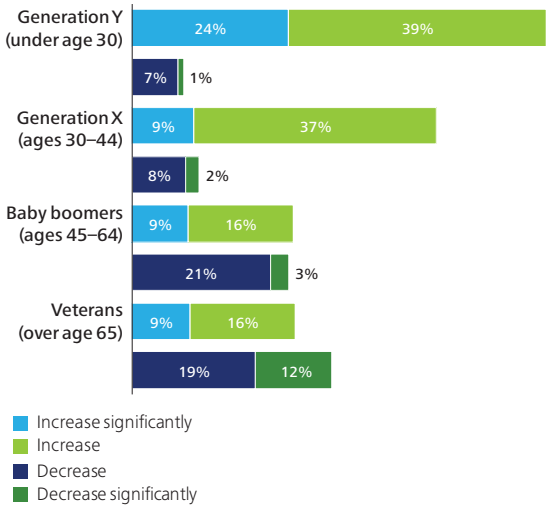
Reinforcing retention

Retirements may be inevitable, but some turnover can be prevented by understanding why valued employees leave for other jobs. In some cases, generational differences may help explain defections (Figure 6); in others, departures may stem from lack of upward mobility or working conditions.[6]

Whatever the cause, voluntary turnover represents a significant expense that can go well beyond the hard costs of recruiting, hiring, and training each new employee. When critical workers leave, it can lead to an increase in recordable safety incidents or even unplanned downtime of critical equipment if they can not promptly be replaced. There is also a risk valuable institutional knowledge will be lost if it is not transferred to others.

Workforce data analytics can not only reveal which employees or employee segments are at the greatest risk of quitting but also what to do about it. During a comprehensive review of a company's HR employment database, one oilfield services company discovered that it could improve earnings by $3 million each year for every one percent decrease in its voluntary attrition rate. That was the finding of a comprehensive review of the company's HR employment database. The review was designed to identify the major drivers of the company's attrition, identify and address regions and workforce segments at risk of high attrition, and better understand why employees were leaving.

Figure 6: Executive predictions of postrecession voluntary turnover by generation



Source: Deloitte Consulting LLP analysis[6]

[6] "Managing Talent in a Turbulent Economy: Playing both Offense and Defense," Deloitte Consulting LLP, 27 Feb 2009, https://www.km.deloitteresources.com/sites/live/consulting/kam%20documents/all%20consulting/kmip-13418/us_talent_=managingtalentinaturbulenteconomy1.pdf.

Through data analysis, it became clear that two particular roles within the operations group had the highest two-year voluntary attrition rates among the critical workforce segments - those employees that drive disproportionate value within an organization (Figure 7). Additional analysis at the individual crew level uncovered there was disproportionate attrition among a small number of crews that was contributing to elevated attrition at the regional level.

With this information, the company was able to take immediate action to resolve issues and improve morale in the problem areas. They also began designing a retention improvement – focused transformation plan that included a revised retention bonus program and an overhaul of the recruiting and onboarding programs. Additional workforce enhancements were designed to focus on other key, critical workforce segments.

Figure 7: Voluntary attrition in example company's critical workforce segments

Critical workforce segments by region where voluntary attrition had been elevated							
Voluntary attrition (2 years)	Region/BU						Overall CWS attrition
	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	
Field support specialist							
Toolpusher							
Second engineer							
Driller							
Chief mechanic							
Electronic technician							
Master							
Electrician							
Chief Electrician							
Mechanic							
Hydraulic technician							
Installation manager							
Rig manager							
Chief engineer							
Technical coordinator							
Control room operator							
Chief electronic technician							
Total BU/Region vol. attrition							

Highest
Very high
High
Low
Very low
Lowest
Unfilled positions

Source: Deloitte Consulting LLP analysis

Conclusion

Given the dynamic pace of change in the industry these days, solving these challenges could easily spell the difference between riding the next crest of opportunity and falling beneath it. The volatility we have experienced in oil and gas markets in recent years is likely but a preview of what is to come in the years that follow.

Perhaps above all other qualities, nimbleness will be crucial to weathering these cyclical changes, particularly as it relates to managing human resources. The old workforce planning strategy of "set it and forget it" has outlived its use; rapid changes in strategic business direction by many oil and gas industry players, in conjunction with sweeping changes and developments across the industry, are creating a need to define workforce requirements while adopting a progressive, forward-thinking workforce management approach. Due to the recent recession, the past few years have granted oil and gas HR leaders some respite from coming headwinds, but those days are now numbered. We are on the cusp of unprecedented numbers of retiring workers and the ranks of suitable replacements are still thin.

The path to improving an HR organization's flexibility to address these changes runs through data analytics. There is a tendency to think of big data as a bottomless pit — one that can easily drain resources in a frenzied bid to find the numbers that matter. This does not have to be the case. Experience tells us if we think like an economist — critically and with a structured approach — we can yield significant results with a narrow focus. It is through this lens that oil and gas leaders should consider approaching their workforce needs over the coming decade. The search for meaningful insights can be short if you know where to look. Exploring the three key dimensions we have outlined in this paper — workforce planning, talent acquisition and movement, and retention — will help your search for better, more actionable insights be an efficient and fruitful one.

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Deloitte Center
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