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Leading Edge Techniques to Prepare your Organization and Workforce for Oilfields of the Future

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Abstract

Remoteness of operations, scarcity of expert resources and a new hierarchy and expectations amongst partners in the E&P ecosystem expose organisations to increased risks and costly failures.

Implementation of Intelligent Oilfield initiatives is at an inflexion point between piloting and the deep business change required to make them part of a new business-as-usual. Many initiatives have struggled to realise the full value anticipated due to a lack of technology adoption.

There is an opportunity to introduce and institutionalise new behaviours and ways of working to help unlock the value of technology investments. Improvements in efficient, effective and safe execution will become the new sources of competitive advantage.

All this requires new organisation structures and workforce change in terms of skills, knowledge and working at a distance.

Innovative solutions are required. As a leading-edge, innovation-driven industry, E&P demands the same approach to organisation and workforce preparation that is applied to its core business. Entrepreneurial, can-do, E&P culture needs to be complemented with an organisation building mindset to implement lasting change.

This paper looks at the 'future of work'. Based on research in business change, management and technology, it brings the insights needed to address the E&P organisation and workforce challenges for the oilfields of the future.

E&P Evolution

Well documented forces are shaping E&P in the future. Taken together, they present very real risks to safe, reliable and effective operation. The implication that, taken together, they will require a new business-as-usual way of working is becoming clearer, but is not yet fully appreciated.

Challenge #1: Remote operations support

Risk:

• Working at a distance of time, geography and culture stretches the connection upon which safe and effective operation depends.

Implications:

- Local / remote operations support will call upon new workflows and ways of working at individual, operational group and functional level
- "Support centre" model implies changes to roles of individuals, team structures and performance measures

Challenge #2: Scarcity and diversity of expertise

Risk:

• With the ageing workforce, technical experts are becoming a rare breed. Problem avoidance is "too little – too late" *Implications:*

- Existing models for provision of technical expert resource will need to change to maximise the shared utilisation of resources and leverage the knowledge base more effectively
- Workers from mature and developing economies with increasingly different levels of expertise will need to work together effectively and maximize the transfer of knowledge and learning.
- Emerging workforces, partner organisations as well as E&P company staff will need and want different approaches to learning new skills that are more cost & time effective.

Challenge #3: E&P Ecosystem: New hierarchy – New expectations

Risk:

• Expectations of partners and governments in terms of safety, service models and contribution to local economy are not met, leading to reputation damage and cost.

Implications:

- Ever deepening reliance on tightly integrated working with multiple and remote partners: government, advisors and service companies require new service level models and more collaborative infrastructure and behaviours
- The changed nature of relationship between oil majors and partners increases uncertainties and expectations of contribution to local economies, for instance in terms of cost-effective skills development.

Challenge #4: Increasing pace and permanence of technical evolution

Risk:

- Escalating cost of knowledge transfer and skill development or, worse still, failure of staff to keep pace with technical developments. For example:-
 - Micro-drilling replacing traditional deep drilling methods that use massive amounts of costly equipment, material and manpower.
 - Computing power, data volumes and integrated communications drive toward accuracy in modeling and analysis. Whilst this enables a faster pace of business and faster, better decisions, it will also require the adoption of new decision-making protocols and behaviours by staff.

Implications:

- Increasingly fast-changing nature of the knowledge and skills that need to be developed, maintained and enhanced,
- Changes to manpower planning and resource management in terms of how much of what expertise is required, where & when.

At the same time, significant investment and effort has been made in trialling the technologies that make Intelligent Oilfields possible. Now that this period of technological preparation has proved the potential, the next 3-5 years will require significant organisation and workforce change to take full advantage of this change.

The organisation shift required to take full advantage of Intelligent Oilfields can help mitigate the risks and provide solutions to address the implications of the challenges set out above.

Such transformation will not be easy given it is a new way of doing business. The broad scope of Intelligent Oilfields touches every part of E&P, and there will be resistance to changing the current, deeply ingrained ways of working.

Operating Challenges

Looking at the pre-operate, operate and abandon phases of E&P, getting these things right can contribute significant measurable benefits both directly in their own right and indirectly in unlocking the value of technology investments in Intelligent Oilfields:

- Avoidance of (repeat) problems and reduced time to problem-solve
- Greater skill development at less cost and faster time to effectiveness
- Improved balance of experts 'up-time' as compared to travel time
- Constantly drive down the cost of capturing and sharing expertise and experience
- Greater up time, i.e. less non productive time (but still within safety guidelines) through effective handling of issues
- Attractiveness to younger generation recruits though new ways of working
- Fosters consistent use of good practice which impacts positively on safety and risk
- Minimise impact of change on operations through more replicable and scaleable introduction of new ways of working

Further reputation and competitive advantages accrue as the high levels of excellence and visible local skill-building implied in the above are evident in E&P's business-as-usual operations.

Organisation and Workforce Preparation

Preparing the organisation and workforce to take full advantage of the opportunities presented by Intelligent Oilfields requires E&P firms to establish the right frameworks, process and tools to enable the change.

IBM's research and experience combined with standard organisation theory highlight a number of disciplines and prerequisites that must be addressed to help E&P firms operate efficiently in an Intelligent Oilfield environment:



Figure 1 – Key organizational change disciplines to enable the Intelligent Oilfield

Making it happen

Whilst the link between these enablers and the successful implementation of Intelligent Oilfields may be self-evident, the current track record indicates that E&P firms are not systematically addressing these aspects of organisation and workforce preparation. There has been a tendency to introduce Intelligent Oilfield technologies and then revert to traditional operating practices, mostly focused on re-active fire-fighting. The challenge for E&P firms is to make time and create an environment in which these approaches and new ways of working can be established and embedded into standard operational practice.

Organisational & workforce preparation must: be designed around individuals and groups; be part of an integrated, benefitsdriven, approach; and avoid operational discontinuity during transition. The examples used earlier serve to illustrate that this organisational and workforce preparation needs to be tailored around the needs of target groups. For instance:-

- Field workers: there will be changes to what they do and how they do it
- Technical staff: need to understand the importance of sharing rather than doing.
- Operations management: will have a role as change leaders as well as taking on changes to their own operational roles.
- Executives and leaders: need to set the tone for change and technology adoption.



Figure 2 – Managing the organizational and workforce preparation

Rising to the challenge: exciting times for the future of work

There are many innovative approaches and technologies, either proven or in research, which are being used to address these challenges in E&P and other industries. Some examples of application relevant to E&P include:

- Deeply immersive 3D technology is starting to transform social networking and collaboration and driving new ways of working.
- Use of advanced collaboration environments, linked to greater analysis and interpretation of drilling data and earth models by experienced resources working in a central function, means that the experience of the organisation can be captured and spread across a wider base.
- Web-enabled workforce-wide conversations (Jams) are proven to increase employee engagement, participation and ownership in major transformation, and act as new sources of innovation.
- Lessons are being drawn from MMOG (Massively Multi-player On-line Games) in how to play, learn and share and do so across cultural chasms. Such parallels are important in the apprentice-like transfer of expertise from maturing to emergent workforces.
- Remote learning is now an expectation of staff and the behaviours and technologies needed are in place. This can provide massive efficiency and effectiveness gains, especially in the context of high staff turnover and high rate of change industries such as E&P has become.
- The conjunction of human factors, research and information technology is already enabling the virtualisation of work and driving up productivity by: bringing work to people; contextualising information for improved decision-making; semantic search; and automated categorisation of massive volumes of data, text, image and speech.
- Significant experience has been developed in recent years in the shift of workforces from functional- to serviceorientation in terms of the organisation and management processes that need to be put in place.
- Capacity planning and resource management processes are better understood and now routinely technology enabled, providing data at the level of skills and capability to inform short, medium and long term workforce forecasting and planning.

- The role of experts and communities is vital to the intelligent oilfields in the future. Social network analysis is being used to identify and locate the real experts within organisations and design and assess the effectiveness of capability building communities.
- Transformation change management is well understood, but it's proven techniques too rarely applied. Developing change leadership skills at all levels is vital to any large transformation. Ensuring staff understand 'what's in it for me' through clear visibility of new career paths and talent development will foster or kill employee engagement. Proven approaches to measuring 'culture' and behaviours and designing appropriate interventions can bridge cultural divides inherent in Intelligent Oilfields remote working.

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- Institute of Business Value
- Oil & Gas Centres of Excellence
- Technology Usability Competency Centre
- Upstream and Human Capital Management practices

Much of IBM's research across disciplines, sectors and technologies is focused on the 'Future of Work' and this has informed some of the views presented in this paper.

We have also found useful the perspectives set out in several CERA papers over the last 2 years, most notably:

- The Digital Oil Field of the Future Making the Transition from Vision to Implementation
- New DOFF Operating Models to Address E&P Human Resources Challenges