Offshore Network

PRODUCTION OPERATIONS: How To Leverage Integrated Operations in the Current Environment

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INTRODUCTION: INTEGRATED OPERATIONS – IS A NEW WAY OF WORKING REALLY ACHIEVABLE?

It may come as a surprise to the hard-core fans of Integrated Operations (IO), but not all IO implementations have been successful. Changing the way people work, and up-scaling and sustaining successful pilots through to company-wide implementation, is a real challenge to organisations used to a more traditional approach. Initiating such changes, getting buy-in from all levels of the organisation, and handling focussed, discipline-oriented workers into cross disciplinary, multi-location teams takes a certain amount of determination from the advocates of this brave new world.

On the surface, the concept of collaborative teams, using state of the art technology to wring every last drop out of a producing asset, appears to be a no-brainer. Ultimately it will be – the real issue is getting to a stage where working in this way is the expectation and the norm rather than the aspiration.

The Drivers

There are strong drivers in place for going down the IO route, in spite of the organisation-wide transformation this will require. We are seeing drivers that are beyond normal production and operational efficiency improvements, which essentially fall into three categories:

1. The increasing complexity of operations, particularly as we head into more unconventional resources
2. The desire to scale operations, whether on an asset basis or organisationally
3. The need to integrate the value chain

These are operational drivers – and give strong validity to change being orchestrated and managed by the operator, working with multiple vendors with specialisms at each link in the value chain.

What can IO do for me?

So, what are we hoping to achieve? There are a number of foundational elements that, once in place, will lead to tangible, measurable benefits:

- A move to a real or right-time way of working based on real-time data and information displayed on screens on the walls
- Multiple disciplines working together as a single team to optimise the oil and gas value chain
- Live "always on" video links from office sites to the operational locations
- Vendors and service providers supporting operations in real time from remote locations

The constant improvement in available technology leads to improved data and information measured in wells, facilities, and pipelines, and this in turn enables a dynamic real-time response to changing operational conditions, which has been shown to add considerable value.

So given all of these benefits, what is preventing some companies from scaling their use of IO from pilots to company-wide implementation, and if they do manage to "scale-up", what are the challenges in sustaining the change in the new way of working?

There appears to be key elements that enable successful implementations, and if any of these fail, the entire transformation is put in jeopardy. IO really can't be done on a partial buy-in basis, there has to be significant commitment from all levels of the organisation, whether in a pilot or a full organisational shift, with full understanding across the board that this is not something that can be achieved overnight. It needs to be understood by all stakeholders that the concept and formation of a collaborative working environment is a capability transformation programme as well as providing new technology to create new ways of working. As a result, it is vital for those involved to understand not only the concepts behind the capability and know who can supply the technology, but lead well, educate across disciplines, and deal with the inevitable push-back tactfully and positively.

Technology and Process may provide the bricks to build an IO project, but People and Organisation are the architects and builders that put the bricks in the right order to create something that is not only functional, but fit for purpose, perhaps even creating a landmark for others to focus on.

Ultimately, business transformation is the overall target for any operator. The rate at which this is achieved across all assets will depend heavily on the maturity and ability of those assets to change and adopt the new working practices, and the way in which the organisation leads and manages those changes. When done well, the results can be truly remarkable and the results can be seen in the very short term – one Major operator expected a return on investment within two years, but the value was realised within six months, and is ongoing.

How do you sustain IO?

While a level of internal training on new and appropriate technology is vital, what is really needed is the ability to work collaboratively with vendors in order to use their technology as an enabler, one that forces a change in the way we work but does not by itself define the success of a project. It is unrealistic to expect a single vendor or supplier to have the requisite skills from reservoir through facilities and pipeline to commercial, and across people, process and organisational change. Our business is inherently multi-discipline, so it is not surprising that this leads to multiple vendors being required to deliver Integrated Operations, and when driven and well-managed by the organisation, is by far the best way to deliver a wide-ranging, fully functional IO implementation.

The age old adage of walking before running applies. Whilst the long-term vision and design of support architecture is extremely valuable, the staging of appropriate technological change, linked to process, organisational and people's ability to absorb that change, is the make or break criteria for success.

Scaling - to phase or not to phase

The decision on whether to phase an IO implementation depends a lot on the assets and the scope. With a greenfield project a horizontal approach and a full "Big Bang" implementation is possible, but as an operator takes on a new asset, it is most likely that a vertical functional approach will be taken based on previous successes. In itself this is no bad thing, if an operator has the people, process, technology and organisation sufficiently in place to repeat a previous implementation. However, all assets are unique, and unless the horizontal, end to end value chain processes are in place, the full value from IO will not be achieved.

Scaling still presents a challenge, and in our experience, is an organisational maturity process that should always be carried out using a step by step approach, carrying along with it continuous training in what is a transformational process that needs to be well-managed.

In conclusion, although much has been done to implement IO in many large and small oil and gas companies, there is still much to be done, not least in the areas of sustaining and scaling operational capabilities. However, in spite of the challenges, this new way of working has now become more commonplace as operators seek to lower their CAPEX and OPEX, improve production efficiency and reservoir recovery, and raise their return on investment. Those companies that will benefit the most from IO implementations are those that are prepared to take a deep breath and embark on the "IO journey". Those with a long-term vision and the skills involved in implementing transformational change, both vertically and more importantly horizontally, will be the ones that succeed and reap the benefits, both on the bottom line and in the less tangible benefits that come from collaboration and working in teams, across disciplines, operational locations and regions.

CASE STUDY: ESTABLISHING A CORPORATE-WIDE APPROACH TO INTEGRATED OPERATIONS IN THE UK

Background

A National Oil Company operating onshore and offshore oil and gas production, has national and international assets and is managing a growing demand for national production against declining fields.

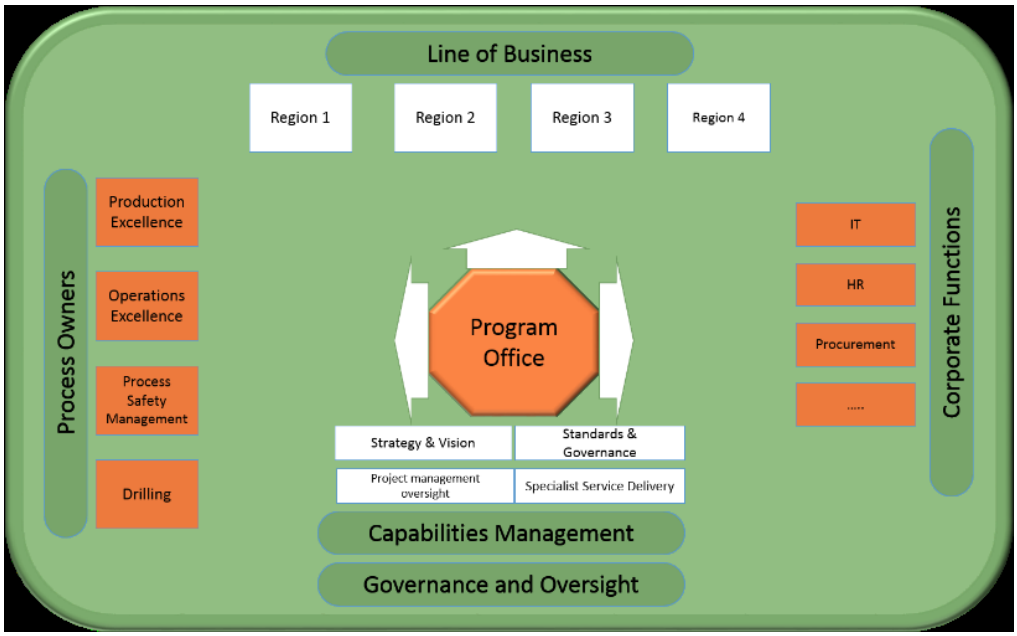
The Company is organised with both international and domestic regional business units that operate with a high degree of autonomy. Over a number of years the units have attempted to implement IO, usually through vendor-led (product and technology-centric) initiatives, none of which delivered any sustainable benefit. This had led to a generally held belief by senior operational management that IO was primarily a technology play and of limited value.

Project Brief

Senior executives within The Company wished to establish a corporate-wide approach to IO, based on a philosophy aligned to business objectives, that would work against the background of independent business units yet establish common working practices, tools and techniques, whilst delivering collaborative working and best practice sharing. Stepchange was selected due to their independent, business value focused approach, coupled with proven experience in establishing a programmatic approach to IO implementation.

Delivered Solutions

- Business case and justification for IO
- IO vision, strategy and scope
- IO philosophy
- IO programme office aligned to scale up/scale out IO capabilities
- Leverage existing IO project deliverables
- Alignment of IO strategy across business units and functional disciplines
- On the job coaching & knowledge transfer for internal IO team
- Collaborative working environment specifications



Outcome

The IO Project ran for 6 months, involved the equivalent of 2 FTEs from Stepchange Global working with the client both on site and remotely from the UK. All deliverables were met and expectations exceeded. The client was able to establish a workable approach to IO that delivered incremental benefits while transitioning to a new collaborative business model.

CONCLUSION: THE FUTURE OF INTEGRATED OPERATIONS IN OIL AND GAS

The times they are definitely a-changing. Walk into any major operator in Houston, Aberdeen, or Stavanger and you cannot fail to notice that people are working differently and using state-of-the-art technology to produce oil and gas more efficiently.

So what can we expect to see? Surely it's an office like any other? People do their job, pass the product of their labours on to the next person in the work process and start on the next task. That may have been true a decade ago, but what we have now is most definitely a brave new world. No longer do people work in isolation, following serial work processes. Oil and gas has caught on to the idea of working in a completely different way. Rather than individual teams closeted away according to their specialism, you are far more likely to see innovative ideas such as:

- Real-time data and information displayed on screens on the walls
- Multiple disciplines working together as a single team
- Live "always on" video links from the headquarters office to the operational locations
- Vendors and service providers supporting operations in real time from remote locations

This fundamental change in operations support has come about in the last decade, and continues to improve oil and gas processes. Dubbed "the quiet revolution" by former Statoil chief executive Helge Lund, it is also known as the Digital Oilfield, Field of the Future, Integrated Operations, i-Field, or Smart Fields, among other names.

The constant improvement in available technology leads to improved data and information measured in wells, facilities, and pipelines, and this in turn enables a better response to changing operational conditions. By making this data available to everyone in the organisation who can add value, it allows running core value-adding processes, such as production optimisation, in a "smarter" way, in real- or near real-time, remotely or across multiple locations, by multi-disciplinary teams. There is a direct correlation between value chain integration and bottom line business value, and this effect is advantageous across an organisation.

Clearly, Integrated Operations is not just about technology. The most significant change that has taken place is in the way companies are organised in order to maximise the value from having this real-time data and information. Many businesses see this as a technology-enabled transformation programme, whereby the way people work, from the offshore technician to the HQ commercial analyst, is fundamentally changed. In order to achieve this, core work processes need to be updated, resistance to change needs to be addressed and overcome, and organisational models and structures need to be re-aligned.

Commonly referred to as the integration of "people, process, technology, and organisation" this fundamental change delivers a capability that adds value in day-to-day operations.

Having this real-time information at one's fingertips allows the company to:

- Maximise the throughput of production systems
- Reduce and recover from unplanned events
- Balance short-term production goals with long-term ultimate recovery
- Reduce costs by optimising maintenance planning
- Maximise the use of scarce resources
- Carry out remote operations and remove people from harm's way

Technology on its own is not going to work as shown by our favourite equation:

NT + OO = EOO
or
New Technology plus old organisation = expensive old organisation

Investment in technology without investment in people, process and organisation could prove to be a very expensive mistake in the long run.

Collaborative Environments Are Key

With today's focus on unmanning or minimal manning and decreasing operational costs for remote, offshore platforms, the use of Collaborative Environments ensures that operational issues can be solved with real-time information. Collaboration centres make the best use of scarce resources by creating an operations hub where experts from a variety of disciplines can access information, troubleshoot, monitor, and optimise the oil and gas fields, all from a single location.

IO provides the perfect collaborative environment for communication, data collection, reporting, monitoring, and information sharing. These physical workspaces are intended to help people make better, more informed decisions in order to take the appropriate actions across the enterprise on time and in real time. Opportunities can be prioritised, with the common goal of maintaining optimal, unbroken production.

Innovations in various collaborative technologies are helping companies make integrated operations a reality. Today's collaboration centres provide not only a high-tech physical workspace, but a new way of operating. Access to a complete array of digital, real-time data linked with state-of-the-art technology, facilitates the operations process and gives personnel the comfort level to make decisions quickly and intelligently. This ability to make rapid, informed decisions defines efficient operations.

Digital Architecture leads to "Intelligent" Platforms

Technology trends in upstream oil and gas exploration and production provide the potential for operators to improve recovery, optimise production, and drive operational efficiencies.

Already, many operators are benefiting from the predictive intelligence capabilities inherent in digital network architectures for instrumentation, valves, and controls. In offshore platform environments the result is "intelligent" platforms; floating production, storage, and offloading vessels; and related on-shore facilities. Additionally, innovative subsea and down-hole metering technologies – the means to capture well temperature, pressure, and flow data – have been joined with integrated production system models in support of improved decision-making.

Benefits

It is easy to see that IO can provide multiple benefits offshore. But the benefits inherent in having increased insight into actual well, reservoir, and field characteristics extend far beyond the offshore platform:

- Reservoir models, based on seismic, intuitive predictions from geoscientists, and other exploration technologies, have a major role in determining where wells are placed
- Better production monitoring can deliver an immediate understanding of what is actually being produced, a perennially thorny problem for oil and gas fields with complex ownership relationships
- Knowing what is flowing through the pipelines can help the downstream refineries plan their production and capacity
- Keeping employees and facilities safe from potentially hazardous conditions can result in a flawless health, safety, and environmental record

Technology is NOT the be-all and end-all

New technology for Integrated Operations not only brings changes that speed up the amount and quality of information available to operators, but also inevitably changes the way in which people work. Companies that integrate advances in information and communication technology and processes with workforce-related solutions will be on the cutting edge of the industry's "quiet revolution."

Clearly the movement to use real-time data and information technology is changing the way we work. However technological changes cannot be regarded as strictly IT projects. Ignoring the other elements of an IO implementation leads to failure rather than transformation. It may come as a shock to some, but technology is an enabler, not a final destination, one which forces a change in the way we work but does not by itself define the success of a project.

Connecting people to real-time information fundamentally alters an organisation in a number of ways:

- It speeds up the work process
- It provides data and information that crosses traditional historical boundaries
- It connects locations that are geographically remote
- It allows teams with different backgrounds to collaborate on the same assets

So what is it that has driven these changes? Firstly, we are looking further and deeper for hydrocarbons, in frontier areas that require better technology and better ways of working in order to minimise risk and optimise production. Many operators previously associated with the heartlands of oil and gas production – the Gulf of Mexico, NSCS and Alaska for example – are venturing into more remote geographical areas, with little or no infrastructure, which by their very nature require innovation in both technology and working practices.

Secondly, there has been much discussion in recent years about "the crew change". It is undeniable that the demographics are concerning – it is estimated that fifty percent of oil and gas personnel are due to retire within the next decade, and they will take with them perhaps eighty percent of the knowledge. It is no longer feasible to staff a project in the traditional way – not only are experts not available, but the increase in remote and inhospitable locations quite simply reduces the number of people willing to go. If we want to attract and retain young engineers we have to embrace IO, or they will simply go elsewhere. All of this makes the utilisation of technology, and more importantly the way we use it, daily more relevant.

One significant challenge facing the industry today is the lack of personnel familiar with both digital IT technologies and the needs of the industry. Data management has long been a hot topic in oil and gas, and the need for good quality data and incubating new functions can be a challenge. Finding dedicated data managers or digital engineers – someone who understands not only the engineering, but also the data and IT sides of a project – can be difficult. The use of IO can help capture the 'brain drain' that's occurring in the industry, through the encouragement of sharing information within multi-disciplinary teams.

Only by moving towards multidisciplinary teams of work can sustainable, value-added capability be brought to the process. Production optimisation teams that include reservoir people, petroleum engineers, operations and facilities engineers and commercial experts, enable a lot more options in the way that information flows between the different groups.

However this in itself needs to be approached with caution. Expecting people that have worked a certain way for twenty years or more to work in a multi-disciplinary team can be a hard sell. We are all resistant to change, and too much change all at once can be hard to accept. So how do you manage that? The simple truth is that innovations in an organisation, the way people work and the organisational processes are difficult to implement, but the ultimate increase in bottom line results together with reduction of risk on a personal level, makes the challenges inherent in an IO implementation worth the effort.

It has to be noted that all of our organisations are very different – while the fundamental focus for an operator is to find more oil, safely, and quickly, we are by nature different in the way we do things. More specifically perhaps, IO is dependent on the operational value opportunities available, and these vary across a portfolio of assets. IO is not a "one size fits all" solution – it's a broad and multi-faceted collection of skills, encompassing automation, system integration, IT, discipline process knowledge, people and organisational change management to name but a few, and it is unrealistic either to expect one company to take on all of these without support, or indeed to find a single vendor that can supply all of these skills in one hit.

Lessons Learned from Other Industries

Much of today's intelligent field technology enables operators to accomplish remote tasks they couldn't do previously. The technologies we need are already developed and are being integrated in the industry, including high bandwidth communication, low cost of data storage, video-based technology, and sensor technology. However, looking beyond technological applications used strictly in the oil and gas industry can also be beneficial. It has to be said that the oil and gas industry is risk averse, and often projects will have a 'no new technology' statement, which can restrict a successful outcome. Even industries closely linked to exploration – refining for example – can provide us with new ideas and lessons learned. As an industry we must learn to be less disinclined to seek new ideas outside our comfort zone.

In Summary

While there are a significant number of challenges facing the proponents of Integrated Operations, the future of oil and gas that is IO is here to stay. As we become more comfortable with a new way of working, so the benefits will become clearer and worth the effort of managing change within the workplace. The only way to deal with the challenges of deeper, more remote environments whilst coping with a growing shortage of people with deep-seated experience and problem solving ability, is to take on the challenges of the digital oilfield, to use whatever is needed to persuade opponents of change that the new way isn't the wrong way, and make the most of whatever technology is available to us, whether it is rooted in oil and gas or borrowed from other industries. It won't be long before the bottom line confirms that our investment in Integrated Operations has been worth every penny.

ABOUT THE AUTHOR:

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