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The Field of the Future Business Process Transformation: Insights and Challenges

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Abstract

BP's FIELD OF THE FUTURE concept makes use of sensors, automation, and computer networks to move real time operations data to remote sites for analysis, enabling informed and fast intervention decisions. Realizing the value from BP's FIELD OF THE FUTURE technology investments requires an integrated design and change implementation approach to business processes, information flows, and people's roles: excellent implementation of the enabling technologies alone rarely solves business problems. Since most oil companies have access to similar base technologies, how we approach process, people, and change management is a strategic differentiator in digital oilfields.

Within BP, we now have more than two years of experience in holistically approaching the issues of business strategy, process, people, and technology in E&P operating assets. Some key insights include:

- Transforming the business starts with process: teams often don't have a holistic view of how they work today, so it is difficult for them to assess the impact of real time information and continuous optimization. Understanding work processes, and their assigned roles, is the logical starting point for this analysis.
- Building an integrated view of asset activities requires people with systems thinking skills: comparatively few people have the high level view of operating asset integration and information flow to facilitate the development of a current or future work design.

The challenges that remain include:

- Communicating and positioning the transformation offering
- Educating implementation project managers about the benefits of including process and people tasks in their plans
- Establishing reasonable expectations on the engagement and time commitment needed in redesigning and implementing new processes
- Knowing the right level of analysis: not confusing process with procedure
- Recognizing the special challenges of greenfield startups: how to start-up a new asset with new processes from day one.

BP's FIELD OF THE FUTURE

The FIELD OF THE FUTURE project was established in 2003. In terms of technology, it uses sensors, automation, and computer networks to move real time subsurface and facilities data to remote sites for analysis, enabling informed and fast intervention decisions to be made and executed. The same basic concepts of automation, remote information access, and remote performance management are being applied to both existing and new field developments.

We have already seen the impact of intelligent wells, control systems, and real time remote analysis tools on speeding up the pace of interdisciplinary operations support and optimization activities. Similarly, we expect the use and interpretation of near real time, remotely sensed information will transform how development and production geoscience, and reservoir and production engineering is performed.

At the same time as near real time information is available 24 hours a day, seven days a week globally, demographic challenges will limit the number of people available to interpret and act on the associated rapidly increasing data volumes. New classes of tools, like intelligent agents and optimizers, will allow automation of routine data preparation and monitoring allowing some work to move from white collar workers to computers: ultimately delivering the vision of better decisions, faster.

Realizing the value from BP's FIELD OF THE FUTURE technology investments and actually impacting interventions to make better quality decisions than current practice requires an integrated design and change implementation approach to business processes, information flows, people's roles: excellent implementation of the enabling technologies alone rarely solves business problems because few knowledge worker activities are structured enough to allow their complete

automation. Since most oil companies have access to similar base technologies, how we approach process, people, and change management is a strategic differentiator in digital oilfields. Therefore, establishing how to rapidly and easily innovate on work processes and get teams to embrace new ways of working is fundamental to realizing the value from BP's FIELD OF THE FUTURE investment.

Business Transformation

The term business transformation deals with initiatives designed to improve alignment of business strategy and enabling technologies. The pace and extent of FIELD OF THE FUTURE penetration into the business is ultimately tied to the question of how to use scarce resources of people, space, time, and technology to their best and highest potential, and getting alignment across a wide variety of stakeholders about how to proceed.

The agility to quickly implement initiatives on a global scale and realize value in response to unexpected changes is not common place. Over the past two years, BP has been exploring the methods and tools to support business transformation associated with FIELD OF THE FUTURE.

The FIELD OF THE FUTURE offering has developed to include:

- a method and a tool for understanding and communicating business processes
- a small team that understands business process, organizational culture, and change management and has appropriate tools for exploring those aspects
- consulting to state a business problem in a way that can be answered by modeling processes.
- process facilitation and coaching for teams that wish to carry on with the approach
- developing and transferring skills for dealing with transformation into the asset team
- acting as the clearing house for connecting assets with similar challenges

Business transformation is a multi-dimensional problem that requires an integrated approach. Traditionally, the challenge has been referred to as achieving alignment of people, process, and technology (1). While each technology implementation problem is different, most problems of technology adoption generally require investigation of five or more dimensions:

- Strategy - the capabilities required to satisfy the demands of the external environment
- Business processes - the business activities and information required to satisfy the strategic capabilities
- Culture - the shared norms and expectations which either enhance or limit performance
- Technology – the technology selected to physically implement the business process
- Roles - the roles and competencies required to implement the business process
- Organization - organization and team structure, rewards, and employment terms
- Workplace-The location, configuration, and ergonomics of workspaces for high performance teams

Although the tools and activities performed to understand each dimension may differ, the results need to be integrated and delivered in a way that is clearly linked back to the local business challenge.

Linking Technology Introduction and Transformation

Business transformation is linked to BP's FIELD OF THE FUTURE because establishing a capability to understand work activities and explain the impact of new technology and data streams on specific activities and roles performed by asset teams is so fundamental. This linkage is manifested in three ways. First, it is only by walking through the foot print of proposed changes that we can ensure that all relevant stakeholders have been engaged. Secondly, and just as importantly, we want to understand and mitigate potential negative effects of the change, both internally to the team and in its interfaces with external organizations. Finally, BP (like many other large organizations) has multiple concurrent initiatives aimed at its asset teams. The transformation approach also provides a way to understand the complex interactions between initiatives by allowing them to be analyzed against a common framework.

The linkage between technology introduction and transformation is reinforced by the FIELD OF THE FUTURE concept enabling an agile, virtual operating philosophy to be realized. If we can move work to the most qualified people anywhere in the world, we have an increased need for clarity about roles, performance measures, and triggering events to ensure the seamless execution of work. The ability to pull on additional support resources and access the best expertise available requires a significant rethinking of technical support services and their delivery.

BP's Knowledgebase

Having established why transformation is relevant to BP's FIELD OF THE FUTURE implementation tasks, the remainder of this paper summarizes our experiences in large scale process change. Business process transformation activities were begun in early 2004, and continue to ramp up today. Initial engagements were short, explored very diverse problems, and were selected to establish the viability of the basic concepts and approaches with asset teams that were receptive to trying something new on a substantial business problem.

At this point, we have amassed a knowledgebase of more than twenty projects for assets around BP's global operations. Primary focus has been on processes related to optimizing the value from existing fields (base management), and remote performance management of wells and facilities. Initial screening exercises were also conducted in such diverse areas

as assuring well integrity, improving operating efficiency, and progressing NP4 (technology barrier) reserves.

Typical business problems being addressed include:

- Understanding the impact of real time information on the work and organization of an onshore production team of a UK North Sea field.
- Understanding the workflow and support implications of implementing cross functional optimization tools for a Norwegian field, looking particularly at the interactions between onshore and offshore operations staff.
- Establishing a streamlined multi-asset optimization process for Trinidad gas fields such that the roles and activities can be utilized in the design of an advanced collaboration environment.

Active experimentation on the methods for delivery of business transformation projects continues. BP has utilized internal staff, small consultancies, and large global consultancies to perform projects, with BP staff coordinating and validating the results.

Insights

Business transformation activity at BP has been focused on the optimizing base production process. The integrated use of many FIELD OF THE FUTURE technologies (intelligent wells, condition based facilities monitoring, automation, advanced controls, and optimization) will have their biggest impact on how production activities are done. Within the end to end production optimization process, we have needed to look at deeper scenarios dealing with the remote monitoring of wells and facilities in real time, and the activities associated with alert handling.

Based on multiple projects around the world, we can see certain themes appearing. The most important of these are:

Technology alone is not sufficient to transform the work of BP. In fact, many of the new real time data related technologies may overload the limited number of interpreters on an asset team, effectively decreasing their performance. Value realization demands a wider, multidimensional business transformation approach.

Transforming the business starts with process. Knowledge intensive processes are core to the operation of BP assets. Asset staff generally are knowledge workers who have a high level of autonomy in how they approach their activities, and their work is often unstructured, collaborative, and iterative (2). As a result, it is rarely clear what is the baseline, “as is” interpretation process that will be transformed. However, it is possible to model future business processes without explicitly mapping out the “as is”. Understanding the work activities the asset must do is the logical starting point for analysis. We can organize roles, information, and systems by the activity that uses them (3). Focusing early on process can help assets become more efficient and transform their work, even before they implement new technology. When assets do plan to implement new technology, having clarity about the business process allows us to pinpoint where the impacts will be in terms of activities, roles, and performance metrics. The benefits of starting transformation with business processes include:

- Assuring the explicit linkage of business strategy to work activities
- Aligning stakeholders across discipline and organizational boundaries
- Providing a meaningful basis for performance management and metrics
- Allowing us to evaluate the opportunities for deployment of technology in a business context

Building an integrated view of asset activities requires people with systems thinking skills. Business transformation is difficult. The problems we typically see can be characterized by interconnectedness, complexity, ambiguity, conflicts, and corporate constraints. To make significant progress, we need individuals who can understand the work being undertaken by teams, facilitate discussions, and build engagement and alignment

Establishing and maintaining an enterprise business architecture approach is fundamental to global business transformation success. A major challenge for BP’s FIELD OF THE FUTURE is to maximize reuse of process and transformation learning across assets.

We have adopted a method of working where results from each asset have been carried in a common repository or database, which has allowed the re-use of process knowledge across different assets. A significant result for BP during the past year has been to transplant the learning about the optimizing base production process from a single oil asset situation to a multiple gas field optimization problem, which simplified the analysis task for the gas business, and helped to refine which process elements are common across oil and gas assets.

The adoption of a digital database organized by business processes allows us:

- to remember the requirements from different teams across locations and over time,
- to enforce rules about unique naming of activities,
- to allow linking to existing digital descriptions of related procedures and reports without re-working those materials.
- to rapidly propagate changes and modifications.

Scaling up transformation activities generally results in concurrent implementation projects being run by remote, distributed teams. It is at that point when a common methodology, common tools, and a centralized shared knowledgebase become critical to underpin transformation.

There has been success in the collaborative design of new processes, but implementation and long term sustainable embedding of those processes has not yet been demonstrated

to any significant extent. The issues here primarily concern team engagement in the change process, stewardship of interdisciplinary integrated processes, and ultimately needing to deal directly with people.

While it is comparatively quick and easy to draw up business process designs about how things should work in the future, it is generally not efficient to tie up a full asset team in such an exercise. A fairly small team of experts can build reasonable prototypes, and some people actually enjoy working this type of analytical exercise. The big hurdle comes in re-introducing the design and the case for change to the wider stakeholder audience that have not participated in the development of the view of the future.

Meaningful business processes like optimizing base production are integrated, and cross discipline and potentially span organizational and work location boundaries. When the time comes to implement the new process, there needs to be clarity about who can steward the implementation and resolve any type of implementation or performance issue around the process.

Establishing the on-going ownership and stewardship of processes would also help to embed the new way of working. Historically, change initiatives that have not been monitored and shepherded for three years have experienced some back sliding. Active process stewardship, on-going communication, management attention, and performance reporting may provide the mechanisms to make the changed working practices institutionalized and internalized, and help move from acceptance to commitment.

Challenges

The classic text Systemantics (4) opens with the Fundamental Theorem that states "New systems mean new problems". Moving forward, there are new challenges in business transformation to support BP's FIELD OF THE FUTURE deployment. These include:

- Communicating and positioning the offering. There are different approaches to process and change. Some existing assets have familiarity with one or more of those, and require good initial engagement to understand the benefits and costs of a new approach. Not surprisingly, having graphical examples of output generated by a different team on the same work process seems to help reduce many entry hurdles.

- Educating technology development managers, and technology implementation managers about how and when to investigate people and process issues. Understanding issues of who will perform tasks, and the new work process surrounding technology benefits both the team building new systems and their future customers. Ideally, developing a process view early in the life cycle of product development in conjunction with requirements development will allow better validation of the planned use of the tool. Additionally, prior to product rollout there is a need to describe the roles, skills, performance measures, and processes that will be introduced associated with the care and feeding of the new technology.

  Managers charged with implementing technology can also benefit from a process transformation orientation. Implementation needs to address the levers for change, the new work processes to be implemented, workforce reskilling, employment conditions and rewards, and address normal change related issues like dealing with resistance to change, change management, communications, and training.

- Establishing realistic expectations on the engagement and time commitment in business transformation. In the final analysis, dealing with the issues of changing roles, work practices related to FIELD OF THE FUTURE must be owned by each asset team. There are no viable short cuts around team engagement, assigning process stewardship accountability, and competency matching.

  Creating the space to work through these issues is always going to be difficult. Therefore, one of the more important challenges is how to educate middle managers about business transformation in general, and enterprise business process management in specific (5). Being able to give reasonable estimates of the magnitude of a transformation workplan will allow management to understand and monitor progress.

- Knowing the right level of analysis required to solve a specific asset's business problem. Not every implementation problem requires the same level of analysis and modeling. Recognizing the right level of abstraction required to implement a solution is actually one of the more difficult skills to pass on.

- Understanding when to reuse processes and when to allow alternate versions. To simplify implementation tasks, reduce time and cost, and add flexibility in work activity location it would be helpful to standardize and reuse processes and roles across all assets. The issues of synergy and the paradoxical opposing benefits for consistency vs. customization have been observed in other domains (6). Ultimately, the resolution may hinge upon establishing a principle of "common where possible, different when required". How that actually works in a decentralized environment is not well understood.

- Complexity at the implementation layer. Creating a generic set of work processes and roles for handling an activity, such as responding to a slugging condition in a producing well, is quite feasible. Every asset where that transformed work process will be implemented needs to create a local instance that

takes the generic model and replaces it with references to people, organization, locations, information, and infrastructure that exists at the site. For global transformation initiatives to succeed, they need to address the challenge of providing tools and methods to move into the implementation layer where everything looks customized and retain the linkage to the more generic common processes and roles.

- Recognizing the special challenges of implementing change in greenfield assets is a significant issue on FIELD OF THE FUTURE implementation. Stated simply, we expect that new assets start-up as Fields of the Future with new processes, organizational models, and technology.

  A naïve working assumption is that implementing change in a new business is easy: no legacy ways of working to deal with, and no established team culture norms to slow the transformation. The reality is the inverse, because people embrace change more readily when they understand the case for change.

  Staff in existing assets are well aware of the things that don't work quite right and can understand much better how their throughput or work quality could be impacted by technology- understanding the personal benefit in realizing technology value is a powerful motivator.

  Additionally, pre-production assets are normally staffed primarily by project staff whose roles and skills are not the same as those that are in place for first oil and beyond, making agreements about new ways of working difficult to commit to. Perhaps linking the two observations suggests a symbiotic way forward: building up the enterprise business architecture in existing producing assets, and carrying that as a starting set of processes, roles, organizational structures, and performance measures for review and adoption may be the way to reduce the inertia in greenfield assets.

Summary

Implementing BP's FIELD OF THE FUTURE represents a major change in how work is performed in producing assets. Multiple companies have fairly similar component technologies to assemble into their branded future digital oil and gas field implementation programs, and it is unlikely that technology alone will create much competitive distinction between these efforts. Changing mindsets to move beyond just implementing technology, and focusing instead on business transformation where multiple dimensions are addressed to bring business strategy and technology into alignment is a big change: but we need to recognize that the value of FIELD OF THE FUTURE is intimately linked with stakeholder behavioral changes, and design changes in work process. In studying the business process of optimizing base production, and its enabling technologies, we have begun to work through the issues and barriers to linking people, process, and technology in a holistic way.

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