Mobile Solutions for Oil and Gas Companies

Enterprise mobility: a transformation opportunity

Dr. Heiko Loechelt
Dr. Phillip Sievers
SAP AG

Richard Holsman
Silke Lehmann
Manish Panjwani
Accenture

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Introduction

As increasing numbers of oil and gas companies turn to mobile technologies as the catalyst for their future growth and profitability, this paper briefly reviews the state of mobile adoption in the energy industry and outlines a number of high-payoff areas for managers to consider. It also discusses criteria for the selection of mobile solutions and provides some best practices for their implementation.

Applying enterprise mobility to energy industry challenges

In an increasingly competitive, fast-changing, and heavily regulated environment, managing offshore and onshore operations creates serious challenges for oil and gas companies. Up-to-the-minute information spanning their resources is vital. Without it, companies are unable to leverage their people and assets as efficiently as they should. This inefficiency has a negative impact on their productivity and undermines the effectiveness of their environment, health, and safety (EH&S) procedures.

How can professionals in these organizations access information when and where it is most needed? Is there a way to improve operational capabilities and reduce costs?

To help them answer these questions, upstream oil and gas companies are turning to mobile-based solutions to deliver on-demand intelligence, improved information flow, and increased field-force productivity.

In an industry where mobile workforces and globally dispersed stakeholders are the norm, these solutions are becoming increasingly important. Enterprise mobility already ranks as a top-three technology priority for energy companies.[1] And ongoing developments in mobile technologies, coupled with advances in cloud services, analytics, and mobile application security, are extending its value to ever-more applications and users.

Trending toward increased industrialization

Mobile devices are in constant and rapid development, becoming smaller, more powerful, and smarter. Of particular relevance to oil and gas companies, they are also becoming more resilient, with explosion-proof phones and tablets now readily available.

As network bandwidth and coverage continue to increase, smartphones and tablets are becoming ever more attractive, and sales and adoption rates for these devices are growing all the time. Global smartphone and tablet shipments exceeded personal computers for the first time in 2010, and demand has continued to surge. So has the amount of time their users spend online. With 5.9 billion in use globally, mobile devices already account for over 10% of total Internet traffic.

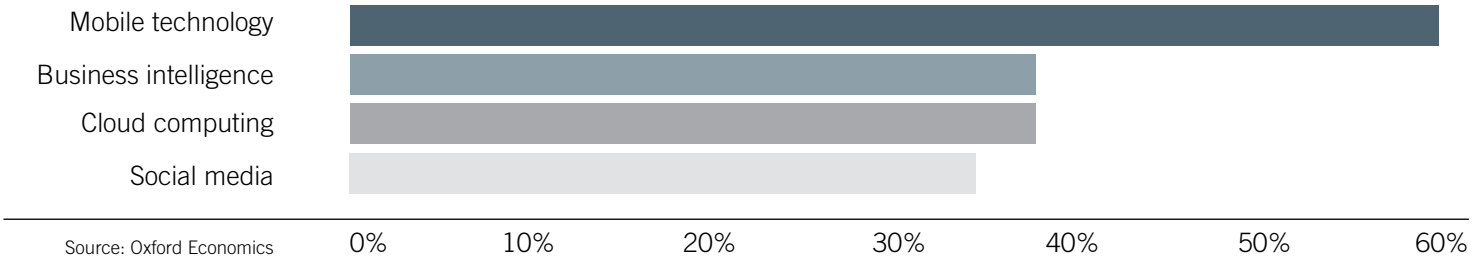
Mobile technology is also becoming increasingly industrialized, as executives come to understand the impact it can have on their business (see Figure 1). Wider trends in many organizations – including convergence to a common operating model and migration to the cloud – are accelerating mobile adoption.

Among oil and gas companies, we see demand shifting from stand-alone mobile solutions to mobile solutions integrated into industry-specific enterprise systems. This shift is in line with the wider trend in this sector for developing and contracting custom applications and hardware that suit the particular needs of oil and gas companies. This trend recognizes that system and workflow requirements in the energy industry are beyond the scope of off-the-shelf software, while the harsh working environments call for ruggedized versions of standard devices.

1. Accenture and Microsoft Upstream Oil and Gas Computing Trends Survey, 2011, www.accenture.com/us-en/Pages/insight-upstream-oil-gas-computing-trends-survey.aspx.

Figure 1: The Importance of Mobile Technology in Driving Business Value[2]

Which do you believe will have the greatest positive impact on your business over the next five years?



Source: Oxford Economics

Increased consumerism is driving companies in every sector, including energy, toward deploying their own specific applications on generic consumer-grade mobile devices such as smartphones and tablet computers, along with ruggedized devices and laptops. Because, where possible, users like to continue using their familiar personal devices and platforms, we expect to see usage of consumer-grade devices increase among engineers and managers in the field.

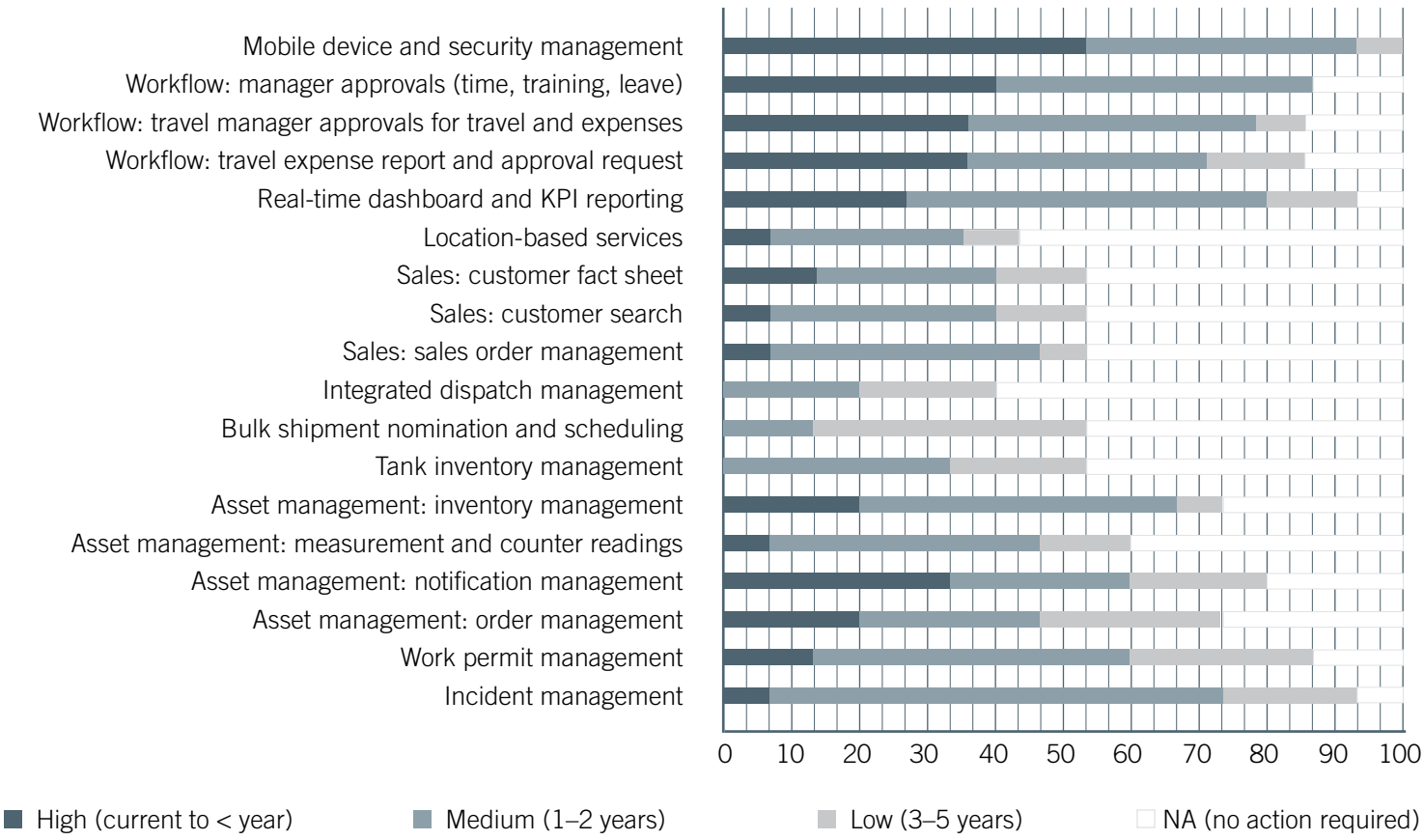
A wide variety of mobile applications can now be deployed across engineering and operations (including drilling, well management, and EH&S). By enabling the seamless flow of information – whenever and wherever it is needed most – the technologies now available have effectively closed the decision-making loop, going beyond mere data capture to include real-time analysis and response in the field. This advancement underlines the drastic shift that has occurred in how companies use mobile technology. Until recently, the primary use had been to get information "out" into the hands of field personnel. Now, however, companies are attaching far greater importance to the inward flow of information to data-driven enterprise systems such as enterprise resource planning (ERP), enterprise asset management (EAM), supervisory control and data acquisition (SCADA), and supply chain management (SCM).

Identifying the opportunity

To help understand mobile priorities within the energy sector, SAP asked its 17-member Global Advisory Council for the oil and gas industry about the existing and planned take-up of mobile solutions across different business areas. The findings are shown in Figure 2.

2. © Copyright Oxford Economics Ltd., "Digital Megatrends 2015: The Role of Technology in the New Normal Market," March 2011.

Figure 2: Current and Anticipated Enterprise Mobility Priorities in the Energy Sector[3]



3. SAP Global Advisory Council oil and gas survey, 2011.

These findings support the fact that oil and gas companies are turning to mobile technology because of its fundamental capabilities to:

- **Reduce cycle time** – by speeding up work and data capture during repetitive or time-consuming activities such as rounds, inspections, repairs, and calibrations. This reduction in process cycle time brings major payoffs in labor costs, customer satisfaction, and product quality.
- **Facilitate the flow of information** – by extending the use of company information and tools to more employees, bringing information to workers where they need it and helping them capture data as they work. This bilateral flow improves the efficiency of field and office employees and helps companies populate their information-driven systems with the data they need to make informed decisions and confirm regulatory compliance.
- **Enable improved customer service** – by providing sales executives with up-to-date information on customers, products, complaints, product availability, and order status. As smartphone adoption continues to increase, business-to-consumer (B2C) mobile applications are becoming increasingly important platforms for enriching the retail experience, boosting customer loyalty and differentiating companies' brands in a competitive marketplace.

However, although executives understand the potential of mobile solutions to transform the ways in which business processes and activities are carried out, they still struggle to select the areas they need to "mobilize." This is due to the rules and regulations applying to the energy sector, as well as the remote and harsh nature of the locations where oil and gas operations are mainly carried out.

In an environment of volatile energy prices, increasing maintenance costs, and regulatory mandates, our experience shows that mobile technology can prove useful in virtually every part of an organization's value chain. Figure 3 highlights the applications that companies can expect to deploy across different areas of their business – to enhance productivity, increase revenue, and enable new business models.

Figure 3: Mobile Solutions for Upstream, Oil-Field Services, and Downstream Operations[4]

Oil and gas industry	Enterprise mobility as a productivity enhancer	Enterprise mobility as a revenue enhancer	Enterprise mobility as a new business model enabler
Upstream	Asset management Environmental assessments Materials management Fire, safety, and security inspections Platform turnarounds Field data management Remote digital document access	Fuel management Fleet management	Analytics and dashboards Real-time data surveillance (OSI Pi), for example, production optimization Global positioning system (GPS), geographic information system (GIS) , radio-frequency identification (RFID) – vehicle, asset, and personnel tracking 2D and 3D visualization and augmented reality Captain's logbook Mobile training solutions
Oil-field service	Asset management Field-data management Product ordering Supply and rental inventory management Bar code/RFID	Field-force management Drilling and logging services: bottom-hole assembly (BHA) configuration, blowout preventer (BOP) service, and so on.	Pipeline and oil-field construction GPS; GIS; vehicle, asset, and personnel tracking Mobile training solutions
Downstream	Asset management Environmental assessments Materials management Fire, safety, and security inspections Rounds and readings Refinery turnarounds	Fuel management Sales-force enablement Fleet management and maintenance, fleet telematics Gross refining margin (GRM) identification	Pipeline maintenance Construction Capacity extensions and retooling Life safety systems Mobile training solutions Mobile wallet Field drawing update

4. Accenture analysis, 2013.

By extending vital systems such as enterprise asset management, calibrations, and project management to mobile devices, leading organizations in the energy sector are realizing significant benefits across upstream, oil-field service, and downstream operations. Examples include the following.

Asset management (upstream, oil-field services, downstream) – Covering the processes related to maintaining offshore and onshore assets, this would include work order management, maintenance management, assets and inventory management, and engineering data management. Mobile applications deliver pronounced benefits by enabling rapid responses to unforeseen risks and timely preventive maintenance. From drill rig and well maintenance to pipeline construction and vehicle maintenance, mobile apps for asset management can be used to accelerate scheduling and completion of work and monitor technicians' access to all the parts, tools, and information they need to finish assignments.

Inspections, condition monitoring, and assessment (upstream, oil-field services, downstream) – Oil and gas companies can achieve significant cost savings and improve operations by deploying mobile apps for inspecting pipelines, environmental assessments, refinery equipment, and other areas. The principal benefit of these mobile apps is that they allow technicians to easily collect large volumes of data and immediately take the necessary corrective action. Data capture can be facilitated using bar coding, radio-frequency identification (RFID), or global positioning systems (GPS) to identify the asset, and then using touchscreen menus, cameras, and other peripherals to record the observation. Data-entry methods, including clickable image control, can be used to identify problem areas, speeding up inspection processes and providing uniformity to inspections data.

Regulatory compliance (upstream, downstream) – Most energy companies handle compliance reporting and management in discrete categories – by geography, business unit, or business function. Mobile apps can simplify compliance processes by enabling accurate monitoring and streamlined reporting on regulatory and safety issues. Because these applications provide frontline managers and executives with real-time access to reliable, accurate information, they also enable rapid responses to potential compliance or safety threats.

Materials management (upstream, oil-field services, downstream) – Mobile devices can be used for materials management functions such as procurement, reordering, and stock transfer orders; collection and quality assurance and quality control inspections; stocking; and issuing. Field-force personnel can use ruggedized mobile devices to collect, update, and synchronize (in real time or batch) to back-end ERP and EAM systems. Service companies and supply chain officers can leverage mobile apps for supply and rental inventory management of high-cost rental goods and equipment.

Mobile supply chain collaboration (upstream, oil-field services, downstream) – Mobile apps help specialist workers to collaborate in real time across the global supply chain without needing to be physically present at the plant; this increases plant availability and reduces time to market.

Workforce management and field-force enablement (oil-field services) – Oil and gas service companies often have hundreds of technicians working on assignments worldwide. Managing these resources is complex and time-consuming. Travel documentation and certification need to be kept up-to-date, and schedules and rotations need to be aligned to priority, availability, and skills. Tailor-made mobile applications that take all these issues into account can help services companies to predict demand and identify, validate, deploy, track, and manage people (in the field and on vacation).

Mobile analytics and dashboards (upstream, downstream) – Analytics-based mobile apps can be used to enable precise monitoring of key business indicators, with executive and operations dashboards providing real-time insights to inform effective decision making. In upstream situations, users can monitor drilling operations via smartphone from almost any location. In addition to logging in online, users can access a snapshot of drilling operations, with job cost, mud weight, daily drilling progress, production reports, and operations summaries all uploaded to the mobile app.

Sales-force enablement (downstream) – Although there has been a massive increase in investment in sales-force automation (SFA) and customer relationship management (CRM) systems, user adoption remains limited. Extending SFA and CRM functionality to accessible, easy-to-use wireless devices puts these high-value systems into the hands of mobile workers, where and when they need them most. This accessibility dramatically improves user adoption rates and end-user buy-in.

Fuel management (upstream, oil-field services, downstream) – Tracking fuel consumption and monitoring timely replenishment is critical to seamless and cost-efficient operations. Mobile apps can deliver functionalities including demand forecasting, fuel order forms, consumption tracking, remote monitoring, delivery management, alerts, reports, and key performance indicators (KPIs).

Electronic logbook (upstream, oil-field services, downstream) – Because offshore supply vessels' activity logbooks are either maintained manually or using Microsoft Excel, it has been impossible for oil and gas companies to standardize processes and scientifically manage voyage operations. This challenge can be addressed using a stand-alone mobile logbook, with capabilities spanning voyage activity, daily vessel status, reporting via e-mail, and data synchronization with the back office.

GPS and GIS tracking (upstream, downstream) – GPS and geographic information system (GIS) vehicle-tracking systems are already used extensively in the energy sector, providing companies with real-time tracking of key machinery and matching asset demand with availability. This capability increases asset utilization and reduces downtime by enabling preventive maintenance practices through real-time monitoring.

Capacity extensions and retooling – During capacity extension and retooling phases, companies need to increase employee productivity ("wrench time") and reduce maintenance backlogs, without compromising safety. Using mobile apps, employees and contractors can capture key information on the spot, quickly route completed tasks to appropriate people for validation and sign-off, and spend minimal time hunting for information. By recording all tasks electronically, the team will also automatically generate a detailed audit trail for regulatory compliance.

Shared services (upstream, downstream) – Mobile apps can play a key role in supporting shared-services organizations spanning human resources, finance, sales, procurement, service agreement management, and application lifecycle management.

Partner collaboration – Partner collaboration often involves a lengthy onboarding process, followed by time-consuming performance analysis, maintenance, and billing procedures. Mobile apps can streamline partner management – from partner selection to partner performance analysis and comparison.

Defining the right approach

From identifying device type and user group to defining the industry segment and principal benefit drivers, multiple scenarios should be assessed and prioritized by management before a mobile deployment can take place. These are outlined in Figure 4.

With so much complexity to navigate, it is no surprise that management in energy companies often adopts an ad hoc approach to mobile technology implementation. However, based on our experience, we know that this dissipates the benefits that can be realized when a mobile strategy is extended across core business applications.

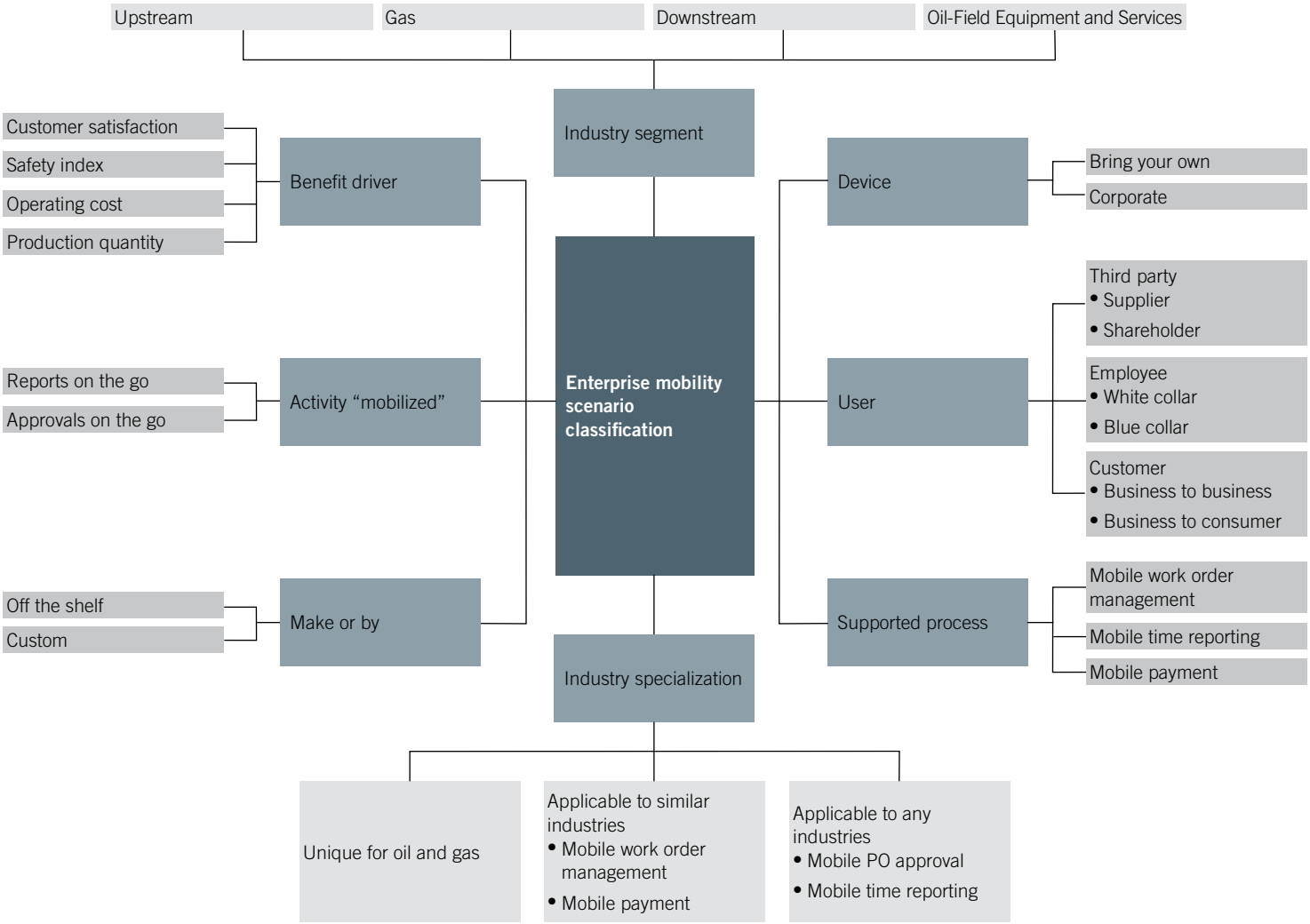
Energy companies seeking to efficiently deploy mobile technology to support their business operations should focus first on how mobile solutions can accelerate delivery of their key business objectives and build a strong business case for the planned deployment. The priority is to develop an effective enterprise mobility strategy, understand current mobile maturity levels within the organization, and put in place a road map – from Phase 1 "quick wins" through to Phase 3 "long-term investments" – that ties mobile deployment to achieving wider business objectives.

Crucially, companies need to recognize that no matter how brilliant the underlying technology or tangible the business benefits, a mobile app that is difficult to use, slow or cumbersome to interact with, or prone to errors is bound to fail.

Figure 4: Multiple Choice: Mobile Scenarios[5]

How can scenarios can be classified?

Enterprise mobility scenarios can be segmented according to multiple criteria.



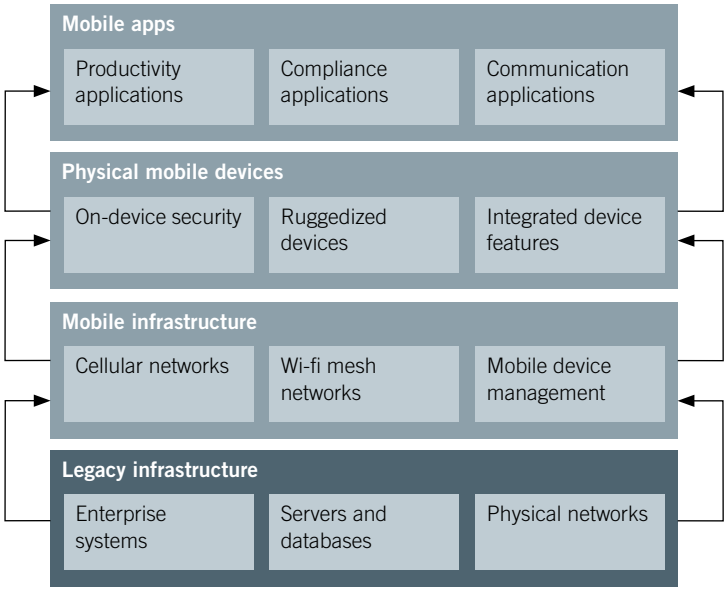
5. Accenture analysis, 2013.

Ease of use and seamless operation are paramount to user adoption and the ultimate success of a mobile deployment. Key factors to bear in mind include:

- **Intuitive workflow** – Mobile apps should reflect the way that your employees work, not the way that back-end systems are set up. Arranging fields and forms in the order of task progression using branching logic to display only relevant information, and breaking up a single form into several screens, tends to improve usability and shorten training times.
- **Device selection** – Matching the right device to the job plays a key role in speeding adoption and improving employee productivity. For example, using a palm-top (instead of a pistol-grip) device in scan-intensive environments may significantly reduce productivity.
- **Battery life** – Device, connectivity, and workflow configurations should be selected that provide the necessary duration of uninterrupted usage for your employees.
- **Availability** – Effective mobile apps are not entirely dependent on connectivity. Although it is very helpful to be able to update information in real time, the behavior of the actual mobile app should not vary with network availability. Web-based, always-on approaches are usually sensitive to network bandwidth and latency and can leave employees waiting for screens to refresh instead of performing work. Thick client–based applications that store all relevant data and business logic on the device can provide real advantages.

Few applications deployed by oil and gas companies are self-contained tools that function in isolation on workers' devices. Mobile apps are generally geared to getting data in or out of back-end systems. Hence, seamless integration with these systems is essential. Figure 5 illustrates a leading-practice approach to enabling this integration through a "simplified mobile platform," where mobile apps, devices, and infrastructures (mobile and legacy) are fully integrated. Oil and gas companies generally have individual components of this platform in place – but are often looking for direction in how to complete the picture. In the next section, we explain how SAP and Accenture are helping to implement mobile solutions.

Figure 5: Simplified Mobile Platform Approach[6]



6. Accenture analysis, 2013.

Implementing mobile solutions

The appropriate mobile apps can integrate into multiple systems at the same time to provide employees with all the information they need through a single application while enabling them to simultaneously update several systems based on information captured in the field. These applications can significantly enhance productivity by simplifying information retrieval and can cut costs by reducing redundant information entry. In effect, the goal is to position the mobile app as the information hub for all the company's back-end systems.

Accenture is working with clients across all industries – including the energy sector – to realize this objective. Accenture, along with SAP, provides three "building blocks" of any successful mobile deployment:

- A mobile platform provides the backbone for companies' mobile deployments, helping business processes and enterprise applications to work together. SAP® Mobile Platform supports cross-platform application development for smartphones, ruggedized devices, notebooks, and tablet PCs for enterprise users.
- Mobile and device management solutions from SAP help companies to manage their devices and applications in a centralized and secure way. Helping employees across functions to download and use applications for day-to-day business operations, mobile management solutions are designed to protect the vast amount of data in the enterprise network from mobile-related risks.
- Governance is integral to any successful mobile deployment – from aligning mobile initiatives with business strategy and objectives, to confirming that they also align with common architectural standards for consistency, quality, and performance. Accenture helps oil and gas companies to develop and sustain mobile governance frameworks spanning policy and procedures, technical architecture, application development, provisioning, deployment, application maintenance, tiered support, and performance measurement.

Recognizing the challenges

As oil and gas companies map out their journeys toward mobile deployment, they will likely encounter significant challenges along the way. Based on Accenture's in-depth implementation experience in this area, we have identified some of the most commonly encountered stumbling blocks.

Mobile deployment challenges include the following:

- **Security** – We have already seen a massive series of hacks against government agencies and private-sector companies. As organizations become more security conscious, they will need to scrutinize the potential risk posed by mobile devices being introduced to their networks by individual users.
- **Privacy and neutrality** – Companies will be worried by the risks posed by data traveling over networks that they do not own, between nodes that may reside in another legal jurisdiction. This situation is a particular concern with cloud services. Many platforms, including Android, are inextricably linked to the servers of their OS creator.
- **IT department lockdown** – Some IT departments may react to the increasing support costs, compatibility issues, and security threats of consumer-owned devices by locking down the infrastructure and forcing employees to use corporate-supplied systems and applications to get work done, which may hurt productivity.

Energy industry challenges include the following:

- **Remote locations** – Most energy companies operate in remote locations. One of the most significant challenges will therefore be setting up and sustaining the mobile services required.
- **Security versus mobile uptake** – Security concerns are a particular concern in the energy industry, where a number of high-profile cyberattacks have already taken place. It will be important to balance the adoption of active cyberdefense with the need to foster mobile adoption throughout the enterprise.

IT services challenges include the following:

- **Fragmented mobile solution provider landscape** – Many small and niche players are currently catering to specific industries. It is important to select providers with demonstrated experience in deploying mobile solutions for oil and gas companies, where the requirements and success factors are often closely unique to the industry.
- **Business model for managed services that is not well established** – With multiple stakeholders involved in the solution – including network service providers and infrastructure service providers – it is important to confirm clear demarcation between the services that will be provided.

- **Difficulty in defining quantifiable business cases across organizational lines** – Owing to industry and service complexity, quantifying the bottom-line benefit of an enterprise mobility deployment remains challenging.
- **Integration into new and existing IT systems** – Having a mobile solution that interacts independently with multiple back-end systems and automatically aggregates information for the user makes the solution adaptable and eliminates vendor lock-in.

Moving toward a strategy for enterprise mobility

The examples in this Accenture and SAP paper illustrate the range of opportunities that mobile solutions bring to companies in the energy sector. Heavyweight mobile applications can be used to support engineers and mechanics with devices ruggedized to run under extreme conditions and function effectively in offline mode where network connectivity is unavailable.

Mobile technology also brings multiple benefits to back-office operations, helping staff to perform essential administrative tasks and increase productivity by reducing reliance on paper-based processes. Management can also realize significant benefits, with access to all key business data available whenever and wherever it is needed. And all these business-to-employee (B2E) benefits can be increased by extending the mobile value chain to the end consumer –transforming customer interactions to improve relationships and build customer loyalty.

Accenture's experience shows that organizations that build a vision for enterprise mobility across all key business functions are the most likely to benefit from these exciting opportunities. Gaining buy-in across the business, understanding how enterprise mobility helps new operating practices, and adopting a structured approach to implementation are all key for driving increased efficiency and productivity. Over time, the focus should be to develop industry-specific services to open up new markets and create a competitive advantage.

The adoption of mobile solutions by oil and gas companies is in its early stages, and challenges still lie in quantifying its impact on the industry. With this in mind, we believe that co-innovation in mobile technologies will help to accelerate results and establish leading practices. Bringing together industry groupings, service providers, and practice leaders will help to put in place an industry-wide framework for strategic adoption and rollout.

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Accenture is a global management consulting, technology services, and outsourcing company with approximately 275,000 people serving clients in more than 120 countries. Combining unparalleled experience, comprehensive capabilities across all industries and business functions, and extensive research on the world's most successful companies, Accenture collaborates with clients to help them become high-performance businesses and governments. The company generated net revenues of US$28.6 billion for the fiscal year ended Aug. 31, 2013. Its home page is www.accenture.com.

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About SAP

Headquartered in Walldorf, Germany, SAP is the market leader in enterprise applications software in terms of software and software-related services revenue. Founded in 1972, SAP (which stands for "Systems, Applications, and Products in Data Processing") has a rich history of innovation and growth as an industry leader. SAP applications and services enable more than 197,000 customers worldwide in more than 120 countries to operate profitably, adapt continuously, and grow sustainably. With annual revenue (IFRS) of €14.2 billion, SAP has more than 55,500 employees located in more than 130 countries worldwide. SAP is listed on several exchanges, including the Frankfurt stock exchange and NYSE, under the symbol "SAP."