Unconventional value chain members have ridden the rollercoaster in the last few years. The rapid market shift from gas to oil has led to significant waste, supply chain displacement and underutilization while assets moved. Operating models have continued to struggle to keep pace as the volume of materials, personnel and equipment became more intense. Equipment usage has continued to strain maintenance operating models in unanticipated ways. The “field” mentality has continued to resist standardized processes and systems.

Supply chain management continues to struggle to keep up. Certain players are beginning to find pockets of leading practices and build value chain collaboration. The rise of 24-hour crew work and multi-well horizontal pads continues to amplify all previously identified issues, and even the most sophisticated hub and spoke structures have experienced inventory management problems and logistics failures. The number of partners and speed of transactions is driving the opportunities for the future.

Unconventional players challenge execution problems

In light of these continuing issues, shale operators face unique challenges, for example:

- As execution pace becomes more controlled and focused on operational efficiency emerges, players must continue to drive waste out of their value chain. Just-in-time material coordination at mobile sites near multi-well pads must be operated with the same sophistication as warehouses.

- The number and complexity of investor, joint venture, supplier and service provider relationships continues to push the limits of legacy processes. There are a number of processes that have systems enabled, but due to poor uptake and understanding, the manual chokepoint still controls the Order-to-Cash and Procure-to-Pay cycles.

- Mobility, disconnected operations and collaborative planning models are still underutilized by most players, which deny the supply chain management function the information needed to make good decisions. No amount of inventory management skill can make up for a lack of demand information; getting these signals early and updating activities as they happen can be an enabler for total cost management.
Raising the bar in shale supply chain execution

To maximize efficiency in the large, multi-well pad execution model, players are focusing on the operations-centric viewpoint to support value chain execution. Processes are being reworked to remove waste and unnecessary steps in order to get the job done and complete recording. There are several areas where operators, service providers and suppliers can take the next steps:

• Joint venture accounting and joint interest billing are automatically integrated with all materials management financial functions and occur without manual intervention during close
• SAP can track, distribute and invoice operating and capital expenditure costs to joint venture partners based on date-effective division of interest calculations. Both invoice and production date cutbacks are supported along with various overhead types, including flat and stepped rate calculations.
• Planning and collaboration between supply chain partners, with systematic demand management can enable cost management and capital preservation for an entire field
• Supply chain collaboration can be enabled with the Ariba cloud applications and business network combined with the SAP on-premise supply chain solution. This architecture supports global scale and reach to empower companies of all sizes. Businesses around the globe can now discover, connect and collaborate with key customers, suppliers and other partners via the Ariba Network. SAP customers can benefit from new scalable and efficient methods for inter-enterprise collaboration.
• Mobile device integration and ability to work in a disconnected state at remote sites is essential to the speed of shale execution
• SAP provides connected/disconnected supply chain, inventory management and enterprise asset management mobile solutions for a variety of consumer and ruggedized devices. Device management solutions such as Afaria allow corporations to apply corporate security and privacy policies to mobile devices and protect sensitive information. Custom application development platforms such as Syclo are also available to extend specific processes to mobile devices if they are not available using one of SAP's off-the-shelf mobile applications.
• Warehouse management at flexible mobile sites that can move with each new pad and integrate quickly into all information processes to conduct live materials management is a competitive differentiator
• SAP gives you full control over warehouse processes, managing movements from the point of goods receipt to goods issue and extending to the yard from the time a trailer checks in all the way through to product checkout. Its slotting and rearrangement functionality can be used to make sure your products are stored in the optimum location, and its labor and resource management functionality helps you manage your warehouse personnel and measure their effectiveness and efficiency. Storage location functionality can be customized with special storage locations to deal with highly mobile field inventory and mobile input devices.
• Integrated logistics tracking, TMS integration, automation of processing and performance indicators will continue to drive efficiencies in logistics execution through control and visibility
• SAP Transportation Management optimizes individual freight units and shipments, and consolidates them for single or multi-modal transportation scenarios in interactive or background planning. Integration with the SAP ERP application supports cost calculation, accounting and controlling, and financial visibility. The track and trace solution from SAP supports technology innovations that enable fast response, real-time visibility and always-on access. It provides information on demand at low cost as well as low risk and is highly scalable with flexible deployment options to empower business professionals enterprise-wide.

Supply chain management is core to each part of the business

<table>
<thead>
<tr>
<th>Exploration</th>
<th>Drilling and development</th>
<th>Production</th>
<th>Gathering</th>
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Business planning and operations should be integrated at every stage
Capturing the opportunity

Driving field- and operations-focused processes are the answer to optimizing full value chain execution. The industry has discovered that field users will reject standardized processes and systems that don’t make sense or were designed without their input. Traditional functional and headquarters silos cannot be the approach point for process design. The knowledge and experience of the people executing must be standardized and improved upon in order to achieve leading performance. Raising the bar on operational process standardization and integrated execution is the only way to ensure sustainable competitive advantage. To do this, players must consider the people, process and technology building blocks that enable and sustain these changes.

<table>
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<th>Critical success factors</th>
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| **Process** | • Integrated processes that include all actions in the total delivery and have realistic expectations around the execution capabilities of stakeholders  
• Standardized business process management tools that are easy to use and adaptable to field stakeholders at all supply chain locations  
• Process alignment with value chain members at key turnover points, enforced in contractual language |
| **Technology** | • Consistent use of the operator’s integrated supply chain technologies, notably the functionality of SAP  
• Leverage of mobile and cloud capabilities in remote environments  
• Integration with suppliers’ supply chain technologies to create the visibility and control of an end-to-end solution  
• Ability to deal with connected/disconnected situations seamlessly  
• Reduced number of steps and simpler user interfaces, the only way to keep the attention of non-headquarters users |
| **People** | • Organizational design that supports the unconventional operating model with supply chain training for field stakeholders who handle materials  
• Necessary technical and functional capabilities and skills within the operator and key suppliers  
• Education and involvement of experienced operators to support requirements gathering and design |

Supply chain management solutions

- **SAP Sourcing On-Demand**
- **SAP Contract Lifecycle Management**
- **SAP Supply Chain Management**
- **SAP Materials Management/Procurement**
- **SAP Business Objects Spend Performance Management**
- **SAP Financial Supply Chain Management**
- **SAP Supplier Relationship Management**
- **Vendor Invoicing Management**
- **Supplier Lifecycle Management**
- **SAP/Asset Management/Project Systems/PRA/JV Accounting**
- **Master Data Management (MDM)**
- **SAP Business Intelligence/SAP HANA**

**Records**
- **Supplier data**
- **Proposals**
- **Supplier performance management**
- **Demand management**
- **Compliance management**
- **Performance management**

**Processing systems**
- **Cloud, internet and mobile exchange networks**
- **SAP Supply Network/Suite**

**Reporting and decision support**
- **Suppliers and service providers**
- **Reporting**
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- A change management approach that helps maintain focus on reliable business operations
- An extensive knowledge of SAP applications that enables the design solutions with both business processes and technology in mind

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