

The Digital Economy: How Connectivity and Collaboration with the Oil and Gas Supply Chain Will Change the Way You Do Business

Executive Overview

Connectivity and collaboration are changing the face of commerce, but amazingly few energy providers are maximizing the use of technology to automate the oil and gas supply chain. When you look at today's commerce, the Web has become the foundation for a giant ecosystem that allows vendors in any industry, including oil and gas, to share business-critical information to promote frictionless commerce. Adopting a paperless, connected commerce model not only shortens transaction time, it enables a variety of other business benefits as well, such as eliminating processing errors and providing a wide range of data for in-depth business analytics.

This white paper explores the possibilities of automating the supply chain for oil and gas companies, including the extended benefits that come with harnessing digital commerce.

Doing Business in the Internet Age

In any industry, the faster a company can respond to changing market conditions, the more competitive they are. Supply, demand, and pricing fluctuate on an ongoing basis, so market agility and the ability to react quickly to market changes and customer demands puts you ahead of the competition. Promoting frictionless commerce is a competitive advantage for any company in any industry, especially oil and gas, and creating paperless, seamless business processes to promote automated transactions is the new competitive advantage for many suppliers.

Technology has been driving oil and gas exploration, field operations, and delivery strategies for some time. However, the oil and gas industry has been slower to apply technology when it comes to managing the supply chain. Using secure connectivity and machine-to-machine communications, oil and gas provisioners can shorten time-to-market for energy products, and more importantly, shorten time to revenue.

Adapting technology to manage purchasing of materials and equipment and sale of energy products upstream and downstream eliminates the paper logjam and enables more accurate billing. The human factor is largely eliminated, and with it data entry and processing errors. In addition, automated transaction processing is extensible and trackable, making it easier to gather intelligence that identifies inefficiencies and highlight ways to improve operations.

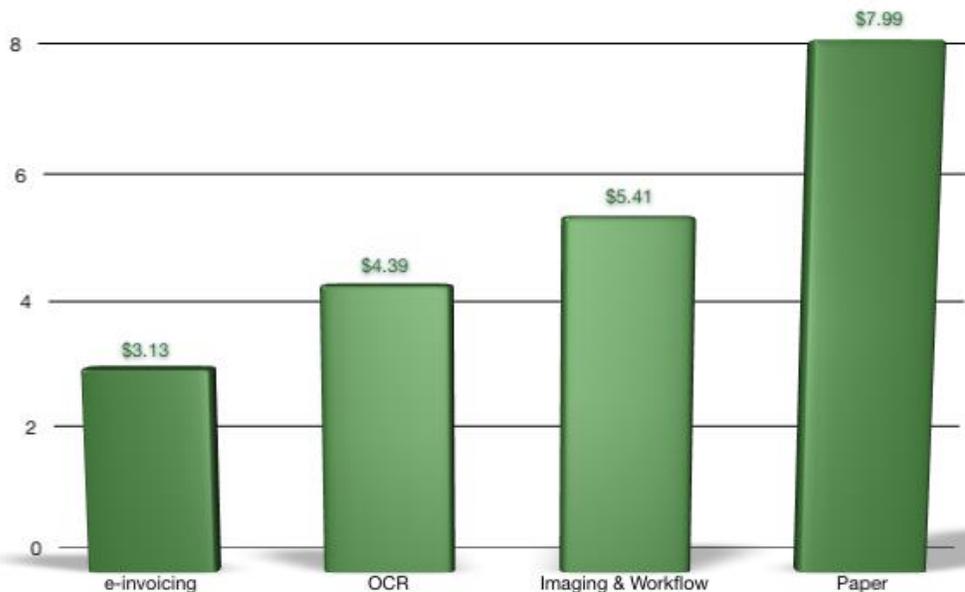
Online commerce and collaboration shortens transaction time and improves cash flow by eliminating delays. It is now possible to automate end-to-end workflow and business processes from production through transportation and refinement, including all the paperwork along the way. By automating the workflow through connectivity, the transaction processes become more efficient and make for a faster, more efficient end-to-end process.

Eliminating Paper Processes

Oil and gas companies remain bound by outdated paper processes that are slow and often inaccurate. Accounts payables wants to capture early payment discounts, but paper approval processes slow down the process, often forcing energy companies to forfeit what is essentially free money. Accounts receivables wants to make sure invoices are correct and issued in a timely manner to speed payment and improve cash flow, but manual, paperbound processes slow delivery of statements which delays payments. By eliminating paper from the billing process, energy companies can take advantage of early payment discounts and shorten time to receipt of payment.

Automating paper processes also eliminates manual billing errors. Manual data entry for invoices, gas statements, run tickets, joint interest billing, and other financials is not only inefficient, it leaves too much room for data entry error that result in loss of time and money. Manual processes require additional auditing which means more time, more labor, more delays, and more processing overhead.

By adopting procure-to-pay technology, energy company can integrate transaction processing into enterprise resource planning (ERP) systems. By automating paper processes as part of overall operations, you can cut the time and cost to generate routine paperwork.



For example, consider that the cost to generate a paper invoice manually averages \$7.99. By automating the paper process with the aid of document imaging and workflow technology, you can reduce the cost of processing an invoice to \$5.31. When you add optical character recognition (OCR) to convert paper documents to machine-readable files, you can start mapping business processes within the ERP system and the cost of an invoice drops to \$4.39. If you

eliminate paper altogether using an e-invoicing process, then the cost to process an invoice drops to \$3.13, almost one third of the cost of paper processes.¹

Machine-to-Machine Communications Speeds Commerce

The key to unlocking true paperless efficiency is machine-to-machine communications. Eliminating manual processes altogether speeds any manual bottlenecks in the supply chain and provides a trackable, auditable payment process.

The best way to optimize the supply chain is to provide machine-generated data to support end-to-end automation starting in the field. Wireless sensors and tracking technology make it possible to monitor inventory from production through refinement to point of sale. The Internet of Things (IoT) is a relatively new concept that is enabling new business processes and analytics by embedding Internet-accessible sensors in machines that control any production process. These sensors can track production levels as well as operating performance and can generate useful data for financials as well as operational analytics.

With the advent of wireless technology, transaction data also can be accessed from almost anywhere. Using handheld devices, such as computer tablets and smartphones, managers can review and approve any necessary paperwork anywhere at any time, which helps shorten transaction processing time. They can even run reports and analytics from the field to view on a handheld device to identify problems.

Once you start using machines to track production and shipping, you can integrate the data into ERP processes to automate all aspects of supply chain management. Materials can be tracked throughout the value chain, and the transactions are accessible and auditable at any time. Data can be analyzed to identify inefficiencies and bottlenecks in the system, and highlight areas where workflow can be improved.

The long-term goal is automating commercial transactions. The supply chain and commercial transactions run more smoothly with the aid of automating technology. Invoices and statements can be generated automatically without error. Machine-to-machine communications even enables immediate cash payments without actually generating paper invoices; electronic data interchange (EDI) and related technologies turn paperless processes into immediate electronic payments.

Streamlining operations using paperless processes to promote real-time collaboration gives energy companies a true competitive edge. It shortens time-to-transaction, improves cash flow, and reduces operating overhead. And as the company refines its workflow, the advantages multiply. The ecommerce system generates auditable data that can be analyzed to improve operations and further shorten transaction time. Ultimately, you have a completely automated, extensible transaction system that creates a firm foundation for future growth.

Understanding Supply Chain Costs

¹ <http://purchasinginsight.com/resources/e-invoicing/e-invoicing-business-case-show-me-the-money/>

The logistics for oil and gas production are more complex than almost any other industry. Any complication in the supply chain can affect production or delivery, which can be disastrous in an industry that tends to run 24 hours a day, 365 days per year. For example, if an oilrig has to stop pumping due to lack of basic materials the cost can exceed \$1 million per day.

The oil and gas production is divided into two basic types of operations, each with its own unique supply chain challenges. Traditional operations are the existing oilrigs that are already producing and have one set of supply chain criteria. Exploratory operations, including “fracking,” have a different set of logistics requirements.

Oil companies tend to manage their own operations, often relying heavily on local resources for shipping and logistics. As a result, operations are often inefficient and it is difficult to centralize administration and get transparency into subcontractor processes. For example, Shell uses 80 local carriers at one production site in western Canada. To control the supply chain, a central command center was established in Calgary to manage operations. One of the objectives was to consolidate activities such as freight bill auditing, payment, and claims processing to streamline operations to coordinate services for greater efficiency.²

In the case of fracking, the supply chain demands are different and equally difficult to control. Extracting oil from shale is more expensive than conventional oil production. Drill heads cost tens of thousands of dollars and piping can cost millions, and the size and weight of some of the equipment makes freight delivery very challenging, especially in remote areas. The equipment needs to arrive at the site in a particular sequence, and fracking takes tons of sand and water, much of which has to be moved by local carriers.³ It’s a delicate balancing act with tight profit margins that is greatly aided by automating logistics processes.

Upstream and Downstream Supply Chains

The supply chain support of upstream and downstream energy suppliers also need to be considered differently.

Upstream oil producers are concerned with drilling, extraction, and recovery of oil and gas from underground and offshore. Supply chain requirements include short-term storage for distribution, receipt of raw crude at ports of call, various shipping channels, and delivery via ship, truck, and pipeline. Tracking the costs associated with extracting and shipping raw materials to the refinery is becoming increasingly easier thanks to IoT technology. Sensors are tracking the volume of oil and gas extracted and shipped and machine-to-machine communications make it easier to match production volume to fluctuations in market pricing. Payments to the participants in logistics support – shippers, truckers, storage facilities, etc. – can be managed using the same processes, using electronic billing to expedite statements and payments, manage joint interest billing (JIB), and handle other complex transactions based on contract terms and fluctuating prices.

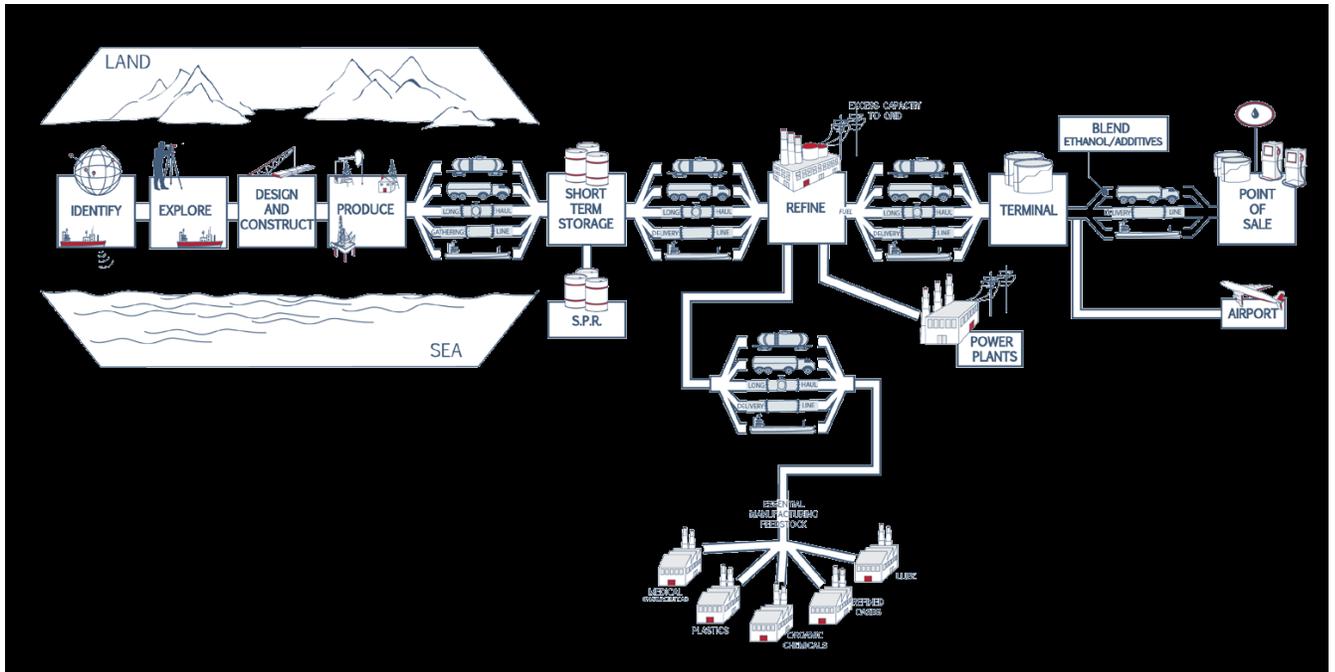
Downstream production to refine oil and gas into final product includes transportation and the actual sale of product to industry, government, and retailers. The logistics to convert raw

² <http://www.inboundlogistics.com/cms/article/fueling-the-oil-and-gas-supply-chain/>

³ <http://www.forbes.com/sites/stevebanker/2014/08/08/the-upstream-unconventional-oil-gas-supply-chain/>

materials into finished energy products include storage facilities, separation plants, refinement, and distribution of the finished product via pipeline, trucking, and other means. The contractual requirements for downstream production are different, and are based on negotiated pricing with customers, delivery fees, and so on. For example, major oil producers only own about 3 percent of retail gas stations, which means fuel sale costs and delivery costs need to be calculated into the contract as part of delivery.

GRAPHIC = SUPPLY CHAIN –



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Optimizing the Supply Chain Through Financial Collaboration

There are myriad steps in the energy supply chain. Each step can require different collaborative relationships, and each vendor has a different financial relationship with the energy company. If the objective is to streamline business processes, i.e. promote frictionless transactions, then any delay in the supply chain can create a bottleneck. Automating transactions and eliminating paper processes is the first step in removing potential delays in the business processes.

Consider the final step in retail delivery of fuel to gas stations. Before wireless communications, the driver would have to get a signed paper delivery order that he would then transport back to the office for data entry and billing. This manual process leads to delay, lost paperwork, data entry errors, billing disputes, and a breakdown of collaboration between vendors.

This type of situation is ideally suited for machine-to-machine communications to expedite statements and payments. Rather than using a paper clipboard, the driver could be equipped with

⁴ <http://www.api.org/~media/Files/Policy/Safety/API-Oil-Supply-Chain.pdf>

a handheld computer with all the necessary information on a wireless tablet. When the order is delivered and signed for, the device immediately transmits a wireless message back to headquarters recording the time of the delivery and all the necessary transaction details. An invoice can be generated and sent before the delivery truck returns to the yard, without fear of misplaced paperwork or manual data entry errors.

We have already discussed some of the benefits of automating a simple task such as invoicing. It has become an accepted fact that eliminating paper from business processes simplifies operations. Automating data entry for gas plant statements, joint interest billing (JIB), invoices, and run tickets streamlines operations and eliminates the need for more time and labor to check and double-check data entry. While other industries have embraced machine-to-machine transactions, the energy industry still lags behind in automating its value chain.

Ardent Partners reports that 76 percent of oil and gas producers and suppliers agree electronic invoicing or eInvoicing is more efficient, but they still use paper processes. PayStream Advisors, a consulting firm that specializes in financial automation, surveyed managers from various industries to compile its 2014 eInvoicing Benchmark Report.⁵ They found:

- More than 25 percent of companies receive no electronic invoices.
- The average time it takes for a company to approve a paper invoice is from five to 10 days.
- The greatest challenges cited for switching to eInvoicing was manager and supplier adoption.
- Manual routing and lengthy approval time for invoices were the greatest causes cited for late payments, missed discounts.
- The greatest benefit cited for automated invoicing was fewer lost invoices, faster approval times, and lower FTE/processing costs.

Start With Internal Automation

To eliminate the roadblocks that prevent frictionless transactions, you first have to start by automating internal operations. That means integrating all transactions and financial processes through the central ERP systems.

Eliminating paper process in favor of direct data capture by the ERP system is the first step. Ideally, you want machine-to-machine interaction from start to finish, so data generated in the field, such as our driver's delivery notice, can be integrated directly into the system. Of course, paper processes are not going to disappear overnight, so you need to convert paper to data.

Intelligent capture or optical character recognition (OCR) is the most common method. Paper invoices, faxes, mailed invoices, receipts, and other paperwork can be scanned into the ERP system. Written information is converted to data and the fields are mapped and data captured by the ERP system for processing. Some companies scan their own paperwork while others outsource it, but the technology has certainly evolved so paper conversion is fast and accurate.

⁵ <http://www.paystreamadvisors.com/2014-einvoicing-benchmark-new-report-fundamental-research-2/>

There also are software packages developed for the oil and gas industry that are specifically designed to handle billing costs, JIBs, and three-way P.O. matching to ensure error-free transactions as part of ERP. Most of these intelligent data capture systems are easy to use and can be configured to prioritize invoices based on potential savings, discounts, outstanding P.O.s, contract terms, or other criteria.

In addition to data entry automation, you need to establish a workflow. By automating invoicing and transactions, many energy companies discover they can actually streamline their workflow, eliminating manual steps such as additional approvals and verifications. One company was able to reduce the time to process supplier invoices from 30 days to three days or less by going paperless. The company also was able to streamline the workflow required to issue an invoice from 60 steps to 12 steps, and triple the volume of invoices it could handle.

Implementing a paperless workflow process also simplifies dispute resolution. The automated workflow process can be audited at any time and information extracted for review. In addition, the workflow can isolate specific contract terms, vendor agreements, and other unique values within the supply chain and even alert management before an anomaly escalates into an error or a supplier dispute. Computerizing the paper trail also improves accountability and eliminates questions since it can be audited at any time.

Automating your own transaction system and centralizing financials as part of ERP will yield amazing results in streamlining operations. However, this is only the first step. To get even more return on your automation investment, you need to extend automated business processes to your suppliers, partners, and customers.

The most efficient form of transaction would be to eliminate the invoicing process altogether and adopt eProcurement, i.e., exchanging machine-to-machine data so transactions are completely automated. This would require a secure means of exchanging compatible information with strategic customers and suppliers.

The advantage of eProcurement is that the system handles the end-to-end transaction. Contract terms, discounts, JIB terms, and other financial conditions are entered as parameters into the system, including payment schedules and financial tracking. Requisitions are added to the workflow, P.O.s are automatically generated and delivered electronically, and when delivery is complete the transaction is matched by the system for verification and payment scheduled.

Centralizing all transactions through the ERP simplifies tracking and auditing of individual transactions and even partnerships. Management now can get a macro view of operations to assess performance, and each step in the value chain has detailed information that can be used as the basis for analysis.

Creating a Common Transaction Platform

Of course, creating a secure, business-to-business data exchange is not an easy task. Not all vendors use the same financial software or ERP platforms, and there are few standards for financial data exchange. In addition, workflows vary, so what may be designated as one type of data field, or transaction in one system may not have a data equivalent in the target system. To

implement a true peer-to-peer e-commerce platform you need to be able to not only exchange data but also make sure that data translates between systems, and you need to ensure that transactions are secure.

Cloud computing helps create a level playing field. More energy vendors are adopting hosted ERP systems to share data with remote offices and make transaction and customer data accessible to mobile users. Adopting a cloud-based ERP system also makes it easier to set up an eProcurement system with strategic partners. Cloud services are more readily accessible and are more secure, and using cloud ERP systems means you can grant partners access without having to compromise security or access to your own network. Cloud ERP services are secure and extensible, both in terms of the amount of data they can handle and in their ability to support third parties.

To automate and integrate supplier transactions, energy companies are increasingly adopting cloud-based, third-party exchange services to manage procurement and payment. The online exchange model allows partners to share orders, POs, statements, JIBs, and other business transactions using a common platform that translates the exchanged data. No matter what the source data format or native file systems, the exchange system matches billing codes and accounting fields at both ends of the transaction.

Using an online exchange system to manage collaborative transactions offers a number of benefits:

1. An exchange offers a secure, third-party data repository for all transactions.
2. Since the exchange operates as a portal there is only one connection needed for all third-party transactions.
3. Transactions stored in the cloud are secure and redundant, so you can be sure to have archived data safely secured based on your contract with the exchange.
4. The data exchange is extensible, so new vendors and partners can be easily added to the system without custom programming.
5. The data is completely auditable and can be accessed anywhere at any time, including downloading historical data for analysis.

An underappreciated side-benefit of creating a collaborative supply chain is operational analytics. By capturing all transactions in electronic form, you have a detailed portrait of end-to-end operations. Analysis and reports make it a simple matter to isolate transaction bottlenecks or operational inefficiencies. Collaborative commerce also provides a pool of transactional information that is ideal for operational projections and even big data analytics. Using historical data captured in the ERP system you can project potential P&L, equipment requirements, regional output, staffing needs, and much more.

The more you can promote connectivity and collaboration with suppliers, vendors, and customers, the closer you get to automating transactions. Start by eliminating the friction points in your own operations, and then you can extend what you have learned to embrace your partners using similar paperless processes. The more you automate collaborative transactions and

workflow, the more intelligence you gather about what works and what doesn't within the automated system.

Truly frictionless collaborative commerce may never be achievable, but the closer you to fully automated, machine-to-machine transactions, the greater the advantages for your operation in a rapidly changing marketplace.